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HOSPITAL DESIGN IN USE

1. VALE OF LEVEN HOSPITAL

CORRECTIONS

Para. 26(5) line 2 *for* (para. 175) *read* (para. 176)

Para. 26(6) line 2 *for* (para. 246) *read* (para. 247)

Para. 26(7) line 1 *for* (para. 262) *read* (para. 263)

Para. 26(8) line 4 *for* (para. 300) *read* (para. 301)

Para. 26(10) line 2 *for* (para. 343) *read* (para. 344)

Para. 89 line 2 *for* Appendix E *read* Appendix D

Para. 92 line 2 *for* paragraphs 364-366 *read* paragraphs 365-367

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1963

Scottish Home and Health Department

Hospital Design in Use Studies

No. 1 Vale of Leven Hospital

ADDENDUM TO INTRODUCTION

Critical reviews of this kind of the working efficiency of the new hospital designs are essential to obtain the full benefit of experience. This study should not be regarded, however, as in any way reflecting on those responsible for the original design who had to work to the requirements and limitations set by the hospital authorities at the time. This particular hospital was designed in exceptional conditions over ten years ago, when much less information was available than now, and there was virtually no post-war experience of hospital building to draw on.

HOSPITAL DESIGN IN USE

1

Vale of Leven Hospital

OXFORD REGIONAL
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REVIEW OF VALE OF LEVEN HOSPITAL

I - INTRODUCTION

1. Early in 1960 it was accepted that new or reconstructed hospitals should be reviewed to assess how they had been found in practice to serve the purposes for which they were designed, and to draw any conclusions which might have a bearing on the planning of other new buildings.

2. The review of the Vale of Leven Hospital, Alexandria, is the first in this series of studies and at a meeting of the Hospital Planning Committee, held on 31st March, 1960, it was decided with the agreement of the Western Regional Hospital Board that it should be undertaken by a team from the Department of Health for Scotland. The report contains a description of each part of the hospital, and points of a general character applicable to future planning are given at the end of each section, with a summary of the main conclusions at paragraph 26.

Acknowledgements

3. These are due to:-

Dr. Cairns - Medical Superintendent
Miss Gordon - Matron
Mr. Campbell - Group Secretary and Treasurer
The Hospital Staff
Dr. Lenihan - Regional Physicist, Western Regional Hospital Board.
Mr. Cunningham - Regional Architect, Western Regional Hospital Board.

4. We acknowledge that this hospital is a busy unit providing a most acceptable service to its area, and it should not be assumed in error that the unsatisfactory features which are reviewed outweigh those that are good. The main part of any hospital is the ward unit, and although certain features were considered to be defective, it should be stressed that their general lay-out and appearance made a most favourable impression on the Study Group. In the same way, although difficulties were apparent due to the fitting of some functional requirements into the pre-determined and standardised areas selected primarily for ward units, the main ancillary departments were found to be operating with remarkable efficiency. In assessing this hospital it is essential to bear in mind that its planning was conditioned to a large extent by efforts to achieve flexibility of structure and speed in construction. This involved the use of standard units (100 ft. by 40 ft. in floor area) for most of the scheme

Survey group

5. The Survey Group from the Department of Health for Scotland comprised medical, nursing and architectural officers, with assistance in carrying out the twelve-hour ward study from work-study officers.

Method of study

6. It may be noted at the outset that a general evaluation survey falls between the type of project in which detailed and comprehensive studies are made over a relatively long period of time by whole time workers, and the more limited inspection in which only general impressions may be gained. It is possible, however, to obtain a useful assessment of functional efficiency by a review of the kind to be described, provided it is undertaken by a team of observers with practical experience of hospital problems and provided also there is full co-operation between the team and the hospital staff.

7. A study was made of the official records relating to the planning of the hospital and covering a period from 1950, and the Group met twice before proceeding to Vale of Leven.

8. The preliminary study, and indeed the whole survey, would have been facilitated by the existence of a detailed Architect's brief. Certain basic requirements such as the number of beds, the specialties to be included, emphasis on the civil defence aspect and the need for speed, economy and flexibility were laid down but the only available description of the function of the accommodation was a paper prepared by the architect, Mr. J.L. Gleave, M.A., A.R.I.B.A., for the Health Congress of the Royal Sanitary Institute in 1951.

9. A proforma was prepared by the Study Group to assist in obtaining a uniform and complete set of observations during visits to the hospital. A copy of the proforma is given at Appendix B, but it should be noted that, while it served as a useful check list, it did not fulfil its original function.

10. Every effort was made during the study to interrupt the work of the staff as little as possible, and this was one of the reasons why the group found the proforma too inflexible and preferred to make notes, either during visits or shortly afterwards. This less rigid approach proved more valuable in noting information obtained during conversations at the place of work and, although it was necessary to revisit Departments to check points of detail, this was an advantage in obtaining an appreciation of the work being done. Visits to ward units at night were particularly valuable.

11. The first visit to the hospital was paid on 24th January, 1961, and took the form of a general discussion held with the Medical Superintendent, the Matron, and the Group Secretary. The objectives of the review were explained and it was stressed that the main duty of the Group was to assess how the various facilities at Vale of Leven were meeting the demands placed upon them, how far the planners' intentions had been realised and what lessons could be learned which could usefully be applied in current hospital planning. This discussion proved most valuable in ensuring that the senior staff was fully aware of the purposes of the review, and useful comments and suggestions were made which assisted the Group at later visits. In many respects the review was in fact a combined operation between the visiting group and the hospital staff.

12. The main sections of the hospital were listed and studied systematically at succeeding visits. Visits were paid by members of the Group either singly or in pairs and the general findings were discussed as the review proceeded. The Group was augmented to undertake a study of the journeys involved in carrying out nursing duties over a twelve hour period in a surgical ward. The results were examined using the string diagram technique (see para. 34).

13. The length of time required for this review was directly affected by the fact that none of the members of the Group could devote their whole-time attention to it. Visits were paid to the hospital on 26th January, 26th February, 15th, 16th and 17th March, 20th and 21st March, 24th April and 29th May, 1961, and the hospital was visited at night on two occasions.

The assessment of efficiency

14. The efficiency of a hospital is affected by many factors pertaining to skills, interests and loyalties as well as general organisation, staffing, the physical design of the building, and the quality of equipment. The aim of any hospital unit is to provide for the satisfactory treatment, comfort, and safety of the patients, for suitable working conditions for the available staff, for the efficient and economical use of a variety of services and for the avoidance of wasted time and effort. A brief review cannot assess the relevant aspects in detail, but a general study undertaken with the co-operation of the staff of the hospital can identify good and bad points for more detailed examination in the course of future planning.

15. Recognised indices of hospital activity are of value in providing a quantitative measure of work undertaken. Tests of efficiency in a broader sense are less easy to devise. With regard to ward units, which

remain the main areas in any hospital catering for in-patients, the best single method of testing the efficiency of the lay-out as it affects nursing work appears to be the string diagram. This type of study requires careful interpretation but it can be used to compare ward units which undertake similar work if due allowance is made for the ratio of ancillary rooms to beds and the nursing pattern in use.

16. The degree to which any new unit fulfils the planner's assumptions depends on these being made known in detail to the staff, on the correct numbers and categories of staff being available to implement the planning proposals, and on the ability of the proposed functional organisation to accept changes in medical requirements and social standards.

17. The main conclusions to be drawn from the method of study may be summarised as follows:-

(1) The team, which may suitably be of four or five members, should include members from Nursing, Medicine and Architecture and represent a wide background of practical hospital experience. Specialist advice should be available to the team as required. One member should act as the leader.

(2) The visiting team should not have been closely involved in the detailed planning of the unit when it was built.

(3) Co-operation with the hospital staff at all levels is essential.

(4) Comments and suggestions by members of the hospital staff should be encouraged, carefully considered and any relevant details verified.

(5) A study of the architect's brief and relevant papers on the proposed function of the hospital should be undertaken before the review begins and these may be referred to with advantage during the survey. Discussion with the Architect is also useful at a later stage and when points requiring clarification have been identified.

(6) It is not only less disturbing to the staff to visit units several times for short periods but a better assessment of function may be obtained by this means than by a single prolonged visit.

(7) Sample studies in detail e.g. the journeys made by nurses in a ward unit may be undertaken without interfering with ward routines. Such studies are useful in estimating ward function.

(8) It is useful for the team to make visits singly or in pairs and for the results, which should be recorded either during the visit or very shortly thereafter, to be discussed by the group as a whole before the next visit with a view to identifying any points which may require to be supplemented or verified.

(9) A list of the kind contained in the headings given at Appendix C is of value as a cross-check for use as the review proceeds.

(10) The team must have available to it a complete set of plans to not less than $\frac{1}{16}$th scale.

(11) Secretarial assistance is required for the typing of notes and the preparation of the report.

(12) The use of photography is helpful.

Brief History and General Description of the Hospital

18. The hospital was opened towards the end of 1955 following a period of some five years' discussion and planning and construction. It was designed from the start as an element of Civil Defence and as such was planned to deal with a sudden influx of casualties. In practice it caters for general

medicine, general surgery, E.N.T. surgery, and gynaecology. At the time of the review it had a normal complement of 149 beds. A diagram showing the general layout is attached at Appendix A.

19. The following table gives the number of admissions, discharges and deaths over five years:-

Comparative Table

	1956	1957	1958	1959	1960
Admissions	1,287	2,711	2,794	3,195	3,390
Discharges	1,117	2,531	2,586	3,002	3,187
Deaths	76	163	195	195	218*

*The average age of patients dying in the hospital in 1960 was 73 years.

Table 1

The changing pattern of morbidity is underlined by the fact that the planners in 1950 laid stress on the need to include a separate ward for patients with tuberculosis but by 1955 this had become unnecessary and the ward had never been used for this purpose.

20. To accelerate the rate of building and achieve maximum economy in cost, a series of standard units formed the basis of the accommodation and the need for "flexibility" was persistently stressed at planning stage. To achieve rapid and economical building the standardised units were designed to allow for the maximum amount of prefabrication. Eighteen standard units, each 100' long x 40' wide make up the hospital. This area was selected as the minimum required to house the ward units and it was appreciated from the outset that the architect had been faced with a situation in which the function of the other units concerned had to be catered for within these fixed dimensions. The standard units were allocated as follows:-

	No. of units
Wards	6
Administration	1
Laboratory	1
Operating theatre	1
Pharmacy and Sterilising	1
Radiology and Physiotherapy	1
Staff dining	1
Training-school, etc.	1
Sister and Matron's accommodation	1
Nurses and domestic accommodation	3
Reception and out-patients	1

21. There is accommodation for 75 members of staff to live in and at emergency spacing 280 beds could be accommodated. A medical and nursing charge was planned to be 52 beds, consisting of two wards male and female each of 26 beds.

22. General medical practitioners are closely linked with the hospital both as regards laboratory services and in clinical work. This association has developed from the period when the nearby Henry Brock Hospital for chronic sick was a cottage hospital. At the time of the survey, 11 practitioners undertook part-time duties in medical wards and this was said to be a satisfactory arrangement. A very small, partitioned room off the link unit is available for their use and serves as a meeting place each morning.

23. The main service spine runs north and south and consists of:-

(1) a basement for the main ducts and pipes, for removal and incineration of refuse, and for storage and mortuary access.

(2) a ground floor which is the main hospital "street" and provides communication between wards, operating theatres, radiology, physiotherapy and out-patient departments, laundry, general supplies and administration.

(3) a first floor which is used to serve the kitchen for food distribution.

24. While the hospital is a predominantly low development, the planning and construction took account of the possibility of further storeys being added at a later date. The decision to build low rather than a multi-storey hospital was to ensure that the buildings were sheltered by the surrounding hills from wind and rain storms.

25. The hospital stands in 29.5 acres of ground, and cost £928,793 including furniture, equipment and fees.

Summary of main conclusions

26. At the end of each of the succeeding sections of this report a note is given on the main conclusions to be drawn concerning the unit described. The following represents the principal conclusions affecting the hospital as a whole.

Design

(1) In general the design of the wards and departments satisfy the functional requirements and indicate considerable architectural skill in overcoming the limitations imposed by the fact that a single standard building unit of 100' × 40' was selected. Nevertheless, the use of a predetermined area to contain the varying requirements of different departments cannot be entirely satisfactory although the construction time may be shortened.

(2) In the context of planning standards ten years ago, the ward unit remains attractive and is most acceptable to patients and staff. The defects in the ward design noted later in the report refer mainly to the planning assumptions on sisters' charges being altered and to the need for additional ancillary rooms.

(3) When the hospital was planned the importance of "flexibility" in design was stressed and changes in the number and disposition of the standard units was anticipated. While alterations have been necessary in the out-patient department, no advantage has been taken of the possible versatility of the accommodation.

Fabric

(4) The use of prefabrication in construction appears to have been economical in time and expense.

Supply

(5) The central supply area, while attractive as a planning concept, has not been found practicable in use (para. 175).

Disposal

(6) The disposal of refuse from wards and other departments is unsatisfactory (para. 246).

Storage

(7) Storage accommodation is deficient (para. 262) and many points relevant to future planning arise from the conditions encountered.

Changing Accommodation

(8) The numbers of non-resident staff and the extent of the need for changing accommodation was not anticipated, and while this has been improvised, a satisfactory scale of provision has not proved possible (para. 300).

Ancillary Accommodation

(9) In the wards and departments the number and disposition of ancillary rooms is not satisfactory.

Mechanical Services

(10) Defects in lighting and heating were noted and these are discussed in the report (para. 343).

Noise

(11) Several areas of the hospital are very noisy. Some audiometric readings are given at Appendix D.

II - WARD UNITS

General description and staffing

27. The first impression gained by a visitor on entering the ward units is good. They are compact, easily supervised and appear to be popular with the patients. All bed areas are visible from the nurses stations, and the day room can be observed from the adjacent circulation space.

28. The staff of the wards was built up gradually as new units were opened and the output from the nurse training school has not yet provided a source of locally trained staff. The basic pattern of nursing in the wards is that of "job assignment" and the average pattern of staffing for 24/26 beds is as follows:-

Day duty	-	one sister, one staff nurse, four nurses (either students, ancillary nurses, or auxiliaries).
Night duty	-	one student or staff nurse, plus one enrolled or auxiliary nurse.
Domestic duties	-	one full-time domestic and one part-time.

29. It was the original intention that a ward sister should be responsible for fifty-two beds, consisting of two wards of 26 beds each comprising, two bays of four beds, four bays of three beds, two bays of two beds, and two single rooms with normal bed spacing. The nearest approach to this concept is in wards 5 and 6 which have twenty-six and twenty-five beds respectively and form a one-sister charge. One single room in wards 1, 2, 3, 4 and 6 is now used as a sister's duty room and the second single room in wards 1 and 2 has been equipped for use as a utility/preparation room. Wards 1 and 2 also have separate kitchens, sterilising and linen rooms resulting from the intention to isolate ward 1 as a tuberculosis ward.

30. These changes are said to have originated partly from a lack of staff nurses, partly from the unsuitable location of the sister's room in the original scheme, and the sharing of the clinical room as an office in the link unit between medical and nursing staffs.

31. The ancillary rooms shared by two wards are:-

Clinical side room/office/laboratory	Domestic service room
Preparation/sterilising/utility room	Staff W.C.
Kitchen	Visitors' W.C.
Linen store	

32. The rooms available to each twenty-five or twenty-six bed ward are:-

Day/dining room
Utility/sluice/test room/flower room/disposal area/store
Bathrooms with W.Cs. (2)
W.Cs. (2)
Nurses' stations (2)

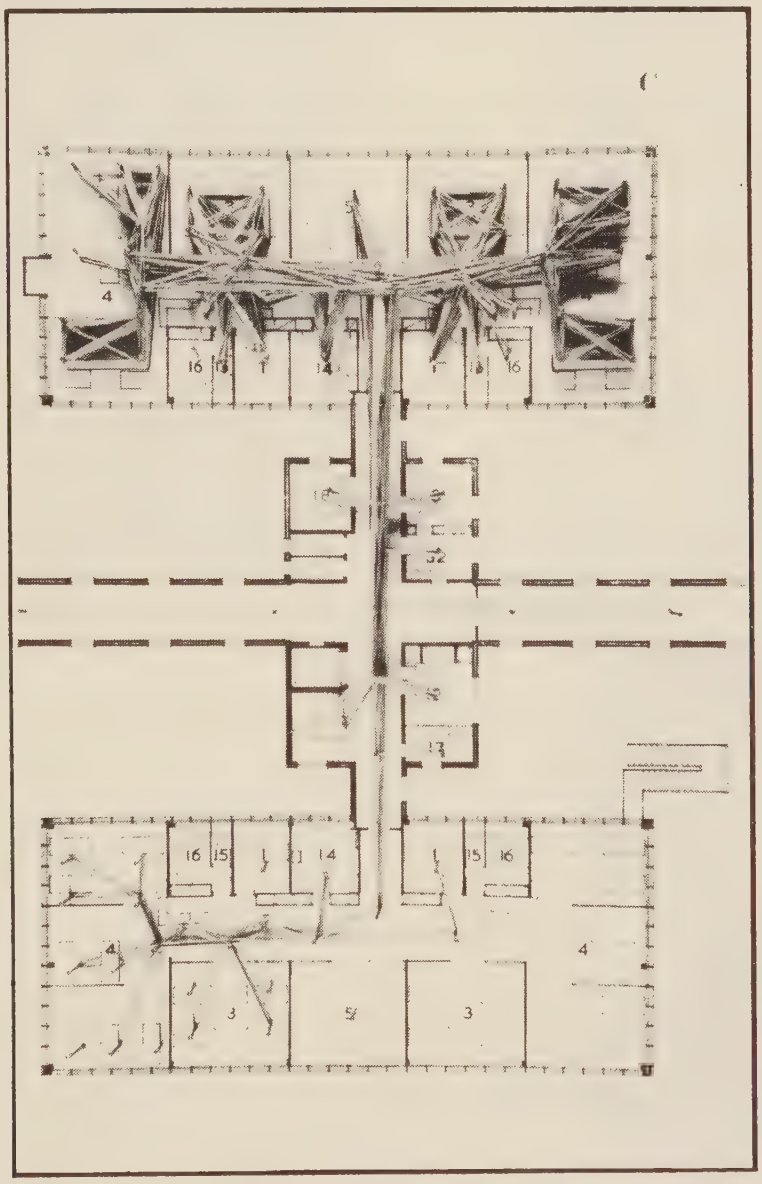
33. The position is summarised in the following table:-

Ward No.	Specialty	Male or Female	No. of Single Rooms	If sharing Kitchen Preparation & Linen etc.	No. of beds	No. of Sisters
1	Surgery	Male	Nil	No	24	One
2	Gynaecology	Female	Nil	No	24	One
3	Medicine	Female	One	Yes	25	One
4	Medicine	Female	One	Yes	25	One
5	Surgery	Male	Two	Yes	26)	One
6	Surgery	Female	One	Yes	25)	

Table 2

34. *Ward Layout* (See Appendix C). A study was carried out to determine the relationships of bed areas to each other and to other rooms as they affect nursing work. Observations were made of the journeys involved in the nursing work performed by all members of staff in one surgical ward over a period of 12 hours. These journeys were then applied to plans of the ward in the form of string diagrams.

35. Lengthy journeys between two rooms or areas frequently used successively can be noted on these diagrams. Heavy traffic in parts of the circulation space and congestion in certain rooms is illustrated by the thickness of the strings.



Photograph 1

Photograph 2
This photograph, taken from the nurses' station, shows part of the range of view which is obtained.

Photograph 3
Nurses' Station

36. Photograph 1 shows a composite diagram of all the journeys made by the nursing staff over the 12 hour period. It clearly emphasises the congestion in certain areas; the under-usage of other areas can be seen by the lack of strings.

37. These diagrams help to indicate where better arrangements of rooms, or additional rooms within the ward unit, might reduce the amount of walking and the congestion within rooms involved in carrying out nursing duties.

Detailed description

38. *Bed Areas.* A good range of view, part of which can be seen in Photograph No. 2, is obtained from the nurses' station.

39. The distances between bed centres average 6'7½" and when the curtains are drawn round a bed the space is inadequate for examination and treatment of patients. There are no treatment rooms and surgical dressings are done in the ward bays behind drawn curtains and under these circumstances the lack of space is most obvious.

40. Cubicle curtain material is very heavy and bulky and this makes them awkward to pull, liable to come off runners and difficult to replace. They are fitted close to the ceiling and when drawn, little air or daylight penetrates into the cubicle making conditions unsuitable for the examination and treatment of patients. When opened, the material obscures some of the night lights.

41. During the period of the survey an experiment in lowering the curtain rails some two feet from the ceiling was made and this was found to be a marked improvement. Only one set of curtains has been supplied for each bed cubicle. The curtains for one cubicle are washed approximately every month and as there are eight cubicles in each ward, individual curtains may only be washed every six or eight months. When curtains are at the laundry, portable screens are used. As a result of shrinkage, the curtains are of variable length and most are between one and two feet from the floor.

42. *Nurses' Stations.* These appear to be satisfactory for observation of the bed areas. Entrance and exit to the stations would be greatly facilitated if they were open at both ends. Both nurses' stations in a 24/26 bed ward are used during the night but only one tends to be in use except as storage space during the day. The floor of each nurses' station is raised some 4½" and the object of this was apparently to improve the range of observation; it is doubtful if any significant improvement has been obtained by this means. Each nurses' station has drawer and cupboard accommodation and the wall immediately behind is fitted with the main switch panel for all ward lights, the patient call system, and with built-in cupboards intended for the storage of medicines. These are small, double-door cupboards with 17" shelves which are too deep for the satisfactory storage of medicine bottles and tend to be used for the storage of other items, e.g., trays, bandages, etc. Storage space for trolleys is also provided at the nurses' station but in several of the wards one of these spaces is used for the storage of a large oxygen cylinder.

43. *Sisters' Duty Room.* These rooms, which were originally intended as single bed wards, are approximately 130 sq. ft. in floor area and are therefore larger than necessary for a duty room. The rooms are in frequent use by medical and nursing staff and are conveniently placed in relation to the bed areas. They contain the normal range of office furniture and the ward telephone.

44. The alteration in the use of rooms has led to changes in the location of the dangerous drugs cupboards in the various wards. These cupboards were originally designed as built-in units of the rooms now used as clinical rooms and which were planned as duty rooms. The present locations of these cupboards are:-

(1) Wards 1 and 2. Dangerous drugs and Schedule IV poisons are contained in a cupboard in the preparation room. The dangerous drugs are in an inner locked compartment and there is a door-controlled light inside the cupboard, but no exterior warning light.

(2) Wards 3 and 4. A similar built-in cupboard has been made at the nurses' station in each ward.

(3) Wards 5 and 6. The original cupboard in the clinical room is still used although it is at some distance from the sisters' duty room. It has the usual inner locked compartment with an exterior warning light.

45. *Utility Room* (Photographs 4 and 5). This represents the "work room" in the 25 or 26 bed areas and it is used for many different purposes, i.e., as a utility/sluice/test room/disposal area/store/flower room. It is some 134 sq. ft. in floor area and its multi-purpose function can be gauged by the range of fitments and equipment found in it:-

double-ended bed pan cupboard

double-ended bowl and basin cupboard

bed pan cleaner/washer (Summerling)

sluice sink

sink

mackintosh rail

sani-chair

dirty linen trolley

treatment trolley

urinal trolley

various cupboards for equipment, flower vases, etc.

working surfaces (mainly cupboard tops)

Photograph 4

Photograph 5

46. The disposal arrangements from this room are by a collection once daily and a considerable quantity of dirty linen, dirty dressings, general rubbish, and withered flowers, remain in it for relatively long periods before the items for incineration or disposal are transferred to a bin in the domestic service room; trays for nursing procedures are prepared here at the same time. Bed pan washers are no longer used as they have proved unsatisfactory for the emptying and cleaning of bed pans and urinals. The sluice sink with a hose attachment is now used for this purpose.

47. *Day Room and Dining Area.* This appeared to be of adequate size. It is just under 300 sq. ft. and this might be too small if a larger proportion of patients were ambulant. It has the defect of being almost fully exposed

Photograph 6

to the main ward corridor and of being in full view from the ward entrance, from which the photograph was taken. While it is capable of easy nurse observation, it tends to be draughty and affords less privacy than is desirable to patients who are in a semi-dressed state. These rooms are equipped with television sets incorporating sound and, as the day area cannot be closed, this can prove distressing to patients in the adjoining bed bays.

48. The easy-chairs are of a comfortable design but moquette or tapestry show definite signs of wear and some have had to be recovered. Tables which do not have a good heat and scratch resisting surface are badly marked.

49. A number of built-in cupboards have been provided but some are too high for easy access and some are too narrow for storage. For example, the top cupboard handles are 8 ft. above the floor.

50. *Bathrooms and W.Cs.* There is one bathroom plus w.c. for each half of a ward unit (12/13 beds) and a separate w.c. for the same number. The inclusion of w.cs. in bathrooms leads to limitation in the use of both.

The doorways to these rooms are too narrow (31" clear space) and this makes the manipulation of a wheelchair or Sani-chair difficult. The bathrooms are approximately 75 sq. ft. in floor area. The baths are raised but the provision of some 20" clearance at one side is a rather restricted space for a nurse when assisting a patient.

51. *Clinical Room/Office/Laboratory.* The functions of this room, which is 116 sq. ft. in floor area now appears to be that of a doctor's office and laboratory. It contains some storage for drugs and equipment.

52. *Preparation/Sterilising/Utility Room.* This room is at some distance from the bed areas and at 90 sq. ft. in floor area appears too small for the preparation of dressings, trolleys and the sterilisation of equipment although it might be adequate in size if a central sterile supply unit was functioning. It contains ten double sided cupboards into which supplies were intended to be placed from the corridor side and withdrawn from the room side. As the door into the room is as near the service lift as the door of the cupboards, this method of stocking and usage has never been practised. These cupboards are not labelled and the only distinguishing feature is that four of them have glass fronts.

53. *Kitchen.* The kitchen of some 145 sq. ft. serving two wards is of generous size, but this area is necessary for the accommodation of the large trolleys which are used to distribute meal trays. There is an adequate number of built-in-cupboards which are used for the storage of teapots, milk jugs, etc., and articles of kitchen equipment at a height of 7'6" from the floor. Some of the cupboards are, however, too high to be convenient for frequent use. Disposal lifts from each kitchen to the basement corridor have been installed but these have never been used because of the difficulty of clearing the items at the basement end. Crockery is not washed in the ward kitchens but is returned to the central dishwashing area at the main kitchen. Cutlery, teapots, milk jugs and glasses are washed at the ward level. Where a kitchen serves two ward units it is much more conveniently sited for one than the other.

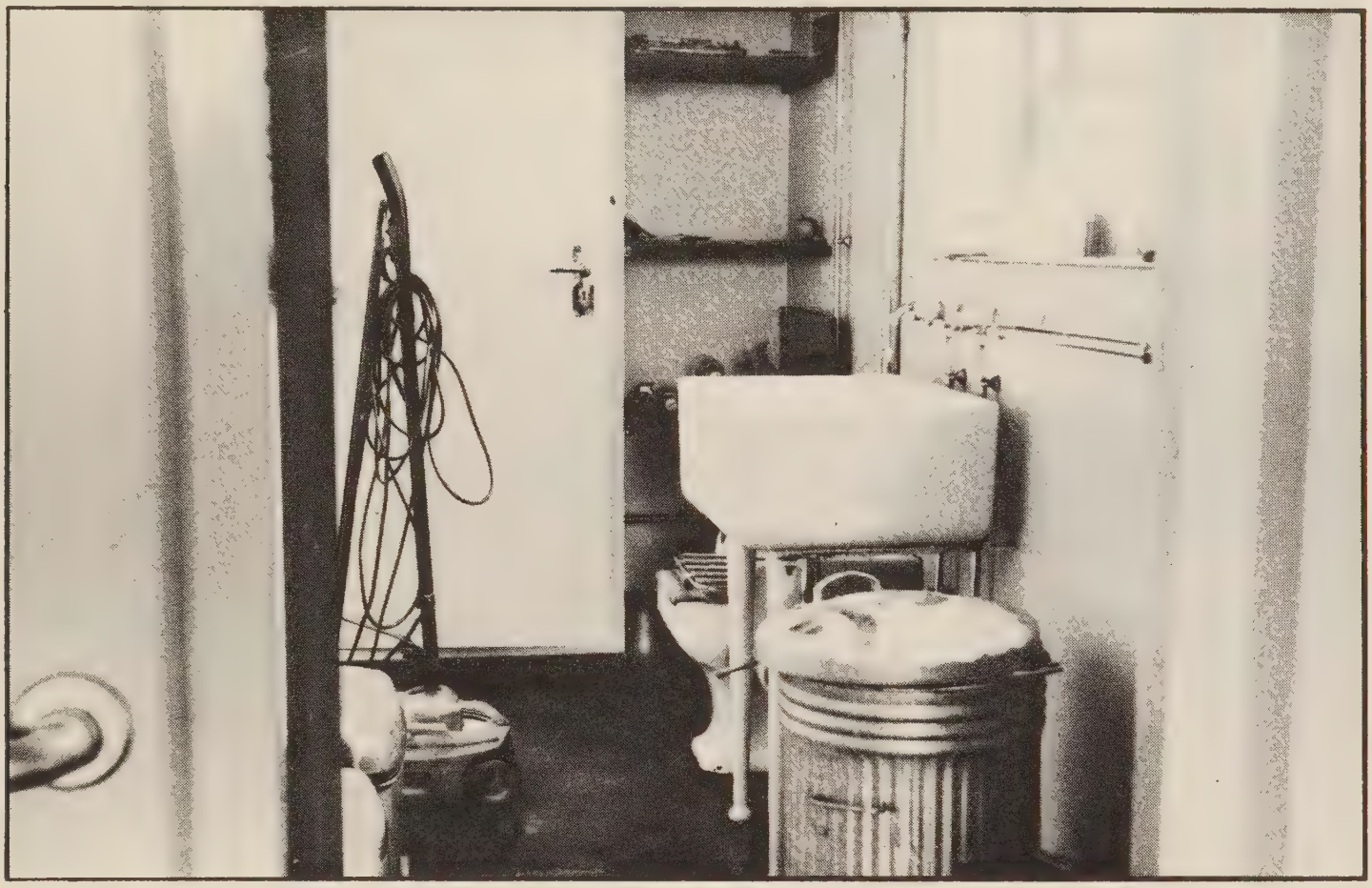
54. *Meal Service.* All hot meals are prepared in the central kitchen and delivered in heated trolleys to the wards. The trolleys are plugged in, at the entrance to the wards, meals are served here, and taken to the patients on trays. On the day of the observation the times taken to serve lunch and supper were 18 minutes and 20 minutes.

55. Meal trays are prepared in the ward kitchens and delivered to the patients on a high trolley designed for this purpose. These trolleys are awkward to load and heavy to push. All dishwashing is done centrally and the hot dishes are returned to the wards in the heated food trolleys.

56. *Linen Room.* This room is adjacent to, but outside, one of the wards in a unit. It is convenient for that ward but is too far from the other ward which it also serves. This means that a day's supply of linen is taken

from the linen room and stored in cupboards or on trolleys in the bed area of the more remote ward. For a ward unit a linen room measuring 70 sq. ft. floor area plus some 40 sq. ft. of cupboard space is of more than sufficient size. Some of the cupboards with the top shelves 6'4½" from the floor have been placed too high for easy access.

57. *Domestic Service Room.* These rooms are 11'3" in length and 4'6" in width and are therefore awkward for use by more than one person. The effective working space is reduced by the storage of bulky floor cleaning equipment. The general disposal bins for the ward units are also placed in these rooms. This is not a proper function of a domestic service room and this is particularly unsatisfactory as they are only emptied once daily.



Photograph 7

58. *Staff and Visitors' W.Cs.* These are in a central position in relation to a ward unit and though small, appear to be satisfactory. In some units one of these W.Cs. was being used as a store for bulky equipment.

59. *Lighting.* All lights in the ward are of the tungsten type and are controlled in groups from the nurses' station and this makes them awkward in use. The bedhead lights are unsatisfactory in that they can only be adjusted in one axis; this leads to frequent breakages. The night lights which consist of 15 watt orange coloured bulbs placed some 18 inches from floor level are ineffective. They were originally enclosed by a metal fitting with a slot to allow downward deflection of light. In practice as this proved to be too dim the metal fittings were removed and replaced with clear glass, but this proved to be too bright. The clear glass was replaced by an opaque type which results in better lighting in a limited space, but leaves shadows round the bed areas and necessitates the use of torches by the night nurses.

60. *Radiators.* The exposed type of radiator installed in the wards is difficult to clean.

61. *Storage of Patients' Clothes.* No specific provision has been made for the storage of patients' outdoor clothes. The normal procedure is for outdoor clothing to be removed by the patients' relatives on the day of admission and returned on the day of dismissal. This interval may be as short as 24 hours and this procedure imposes an unnecessary burden on the relatives who

may be elderly or who may be dependent on public transport and would therefore require to carry the clothing even in wet weather to the main road about half a mile away. If the patient has no relatives or if they do not accompany him at the time of admission clothes have to be retained at ward level. In these circumstances they are stored in any available cupboard, e.g., in the single bed ward, the sluice room or in the clinical room.

62. *Floors.* In the main areas of the ward the floors are of cork tiles, which provide a satisfactory quiet walking surface; but it was noted that after six years definite signs of wear are present. The surface is scratched, stained, and pitted, particularly at the main entrances to the ward and to rooms.

63. *Noise.* While the ward areas do not give the impression of being unduly noisy, audiometric readings taken during the day reveal a significant degree of background noise in spite of the special flooring and the provision of acoustic tiles in the ceiling over the main circulation areas. Some details are given at Appendix D. In visiting the wards at night a loose board in the raised floor at a nurses' station was noted to produce a persistent squeak. This type of noise would not be noticed by day.

64. *Cross-infection.* No systematic studies of cross-infection have been made at the hospital and precise information on its incidence cannot be given. In the past two years only one outbreak has been investigated bacteriologically and it was found to be due to throat infections among the nursing staff. It is probable, however, that although the apparent incidence is not high, a significant number of cases would be revealed if records were kept and particular studies made. There is a proposal to set up a hospital infection committee and when a bacteriologist is appointed one of his duties will be that of hospital infection officer.

65. With the absence of a treatment room and with the multi-purpose utility room, the heavy bed curtains, the scarcity of single rooms and a faulty disposal system, it is a tribute to the nursing staff that cross-infection is not more in evidence.

Points relevant to future planning

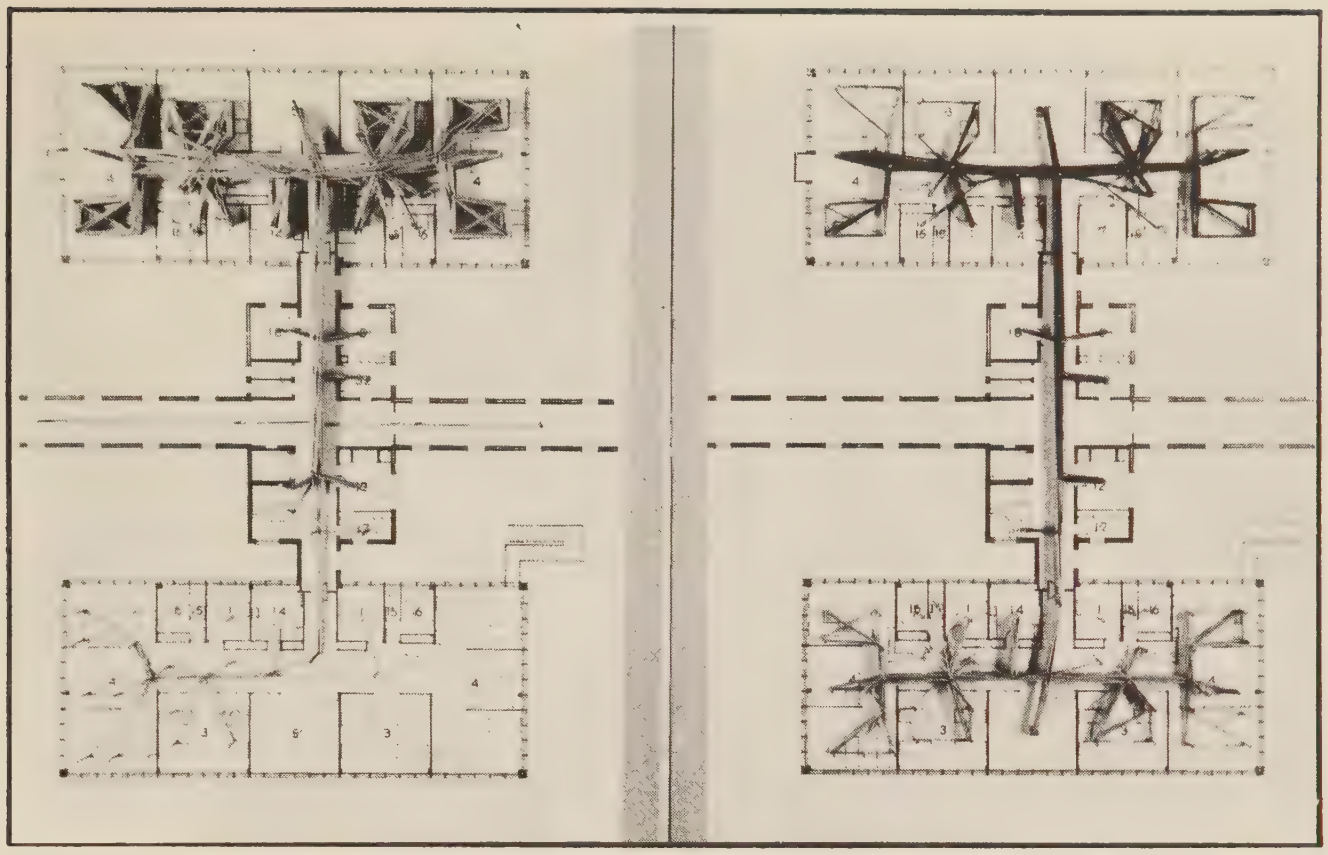
66. These may be summarised as follows:-

67. *Sister's Charge.* Without the advantages of a central sterile supply organisation, a central linen service or clerical assistance, one sister at Vale of Leven is responsible for 51 surgical beds in her care. Other sisters have only 24 or 25 beds. If full supporting services and a reasonable number of experienced nurses are available and if the Sister is relieved of practical nursing duties and able to devote her attention to the administration of her unit a suitable charge might be 40 to 50 beds.

68. *Ward lay-out.* Comparative studies of the ward lay-out were made with those of other new units. The journeys involved in basic nursing work were applied to the plans in the form of string diagrams. The length of string divided by the number of beds in the units gives a simple "efficiency factor". On this basis Vale of Leven ward design was good compared to the others but it must be appreciated that this form of measurement does not take account of what is the correct number of ancillary rooms to a ward unit.

69. The single multi-purpose utility/sluice room of Vale of Leven Hospital reduces the distances walked by nurses but introduces an undesirable and potentially dangerous combination of functions in one room.

70. The bed layout in the Vale of Leven wards is acceptable both to patients and staff. This basic pattern, adapted to meet the wishes of those who consider that closed rooms are a significant improvement on open bays, with a greater proportion of single rooms, and with improved ancillary accommodation, would have much to commend it.



Photograph 8

(a) Actual nursing work in one ward*
(b) Basic nursing work in two wards

71. *Sister's duty room.* It is clear that unless this room is close to the bed areas it is unlikely to be used satisfactorily, particularly if the sister has to undertake practical nursing work.

72. *Single bedrooms.* The provision at Vale of Leven of from none to two single bedrooms per 24/26 beds is regarded as insufficient by some of the staff at Vale of Leven, but the impression gained is that a major increase in single beds was not regarded locally as a matter of major importance. A much higher proportion of single rooms is frequently advocated for reasons of privacy and the reduction of cross-infection, but this review yielded little in support of such arguments.

73. *Preparation and disposal rooms.* These rooms have functions which are complementary, and while they should be separate, they should be in close relationship to each other and to the areas where nursing treatments are given. A single room for combined functions is not satisfactory and is potentially dangerous.

74. *Domestic service room.* A long narrow room of 4½' in width is not a convenient work room for more than one domestic. If the working area is not to be impeded by the storage of bulky equipment recessed spaces or cupboards must be provided.

75. *Day room.* If this space is to be used by ambulant patients who are not fully dressed, it should be located at a point other than one immediately opposite the main entrance to the ward. Areas of this kind should thereby provide reasonable privacy, but, at the same time they should not be out of the main circulation space of the ward so that passing observation by nurses is possible. An area of 300 sq. ft. is too small for a 26-bed ward.

76. *Ward entrance.* The centrally located entrance to the ward units at Vale of Leven hospital would have been improved by the provision of double doors forming a vestibule to prevent draughts and to avoid entering so directly from an open corridor into the centre of the ward area.

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*The journeys shown to the second ward were made by Sister who had additional supervising duties on the day of the survey.

77. *Bed spacing.* An average of 6'7½" between bed centres is insufficient to give adequate space to carry out nursing procedures when the curtains are drawn.

78. *Bed curtains and rails.* The 9'6" ceilings in the wards contribute to their pleasant appearance but when curtain rails are fixed at this ceiling height, runners are difficult to replace if they become detached. When heavy curtain material is used the cubicle becomes airless and dark when the curtains are drawn. The curtain rails should be lowered to some 2 ft. from the ceiling or the upper portion of the curtains made of a mesh material to allow the entry of light and air. Curtain rails should be positioned carefully to avoid obscuring night lights if these are of the type fixed low on the walls.

79. *Bed pan washers.* If, in future, conventional types of bed pan washers are to be installed, it is important to ensure that they will be efficient in use. Sluice rooms should be reserved solely for washing and storage of bed pans and urinals and not used for any other function.

80. *Bed head and night lighting.* It is important to ensure when a selection of light fittings is being made that the type to be installed fulfils the various functions required of such lights.

81. *Windows.* Regulation of the ward temperature and avoidance of draughts is made difficult by the type of window in use.

82. *Radiators.* All radiators in ward areas should be of a closed type.

83. *Doors.* It is essential that doors should allow easy access of beds, trolleys, wheel chairs, and sani-chairs. It is possible that sliding doors may prove useful in certain situations in wards, particularly as they can be manipulated by a person in a wheel-chair.

84. *Cupboards.* The total supply of cupboards in the Vale of Leven hospital wards is generous but some are of limited functional value as they are placed too high for easy access. All cupboards should be located at a level suitable for a nurse of average height to use without requiring to stand on a chair or step ladder.

85. *Storage of patients' clothing.* Specific provision should be made for the storage of patients' outdoor clothing at or near the ward area. This would be in addition to the storage of indoor clothing which should be as near as possible to the bed area.

86. If satisfactory central storage of ward equipment can be provided, maintenance will be of a higher standard and the amount of equipment to be stored at ward level will be small. If no central storage is provided, accommodation intended for other purposes will be used for storage as at Vale of Leven hospital.

87. *Furniture surfaces.* It is essential that the surface of furniture, e.g., tables in day spaces, should be of a heat and scratch resistant material.

88. *Colour.* The general appearance of the ward is attractive but it was the opinion of the study group that too many different colours had been used, particularly in the curtain materials. The value of advice from a colour consultant should be borne in mind when furnishings for a new unit are being selected.

89. *Noise.* It is of the greatest importance that noise should be prevented in ward areas. At Appendix E some readings are given of audiometric tests taken at Vale of Leven hospital which indicate a higher range of noise levels than is desirable. The fitting of acoustic tiles, the cork flooring and the generous supply of wall cupboards have had the effect of minimising noise in the standard ward units to a remarkable extent compared with the levels experienced in other standard units at the hospital. It is important, in the opinion of the study group, that the problem of noise should be

considered at the stage of design as it is inevitably less efficient to attempt to deaden sound transmission after the main structure has been completed.

III - OPERATING THEATRE SUITE

General description and staffing

90. The theatre suite is situated off the main hospital corridor and is almost entirely contained in a standard unit area of 100 ft. by 40 ft. It consists of two operating areas, an anaesthetic room, a plaster room, a recovery ward and supporting ancillary rooms. General, orthopaedic, gynaecological, E.N.T. surgery and some out-patient (casualty) surgery are undertaken in this suite and an out-patient (fracture) clinic is held each week in the plaster room. The suite serves a total of 100 beds for surgical and gynaecological patients. These patients are not transferred to a convalescent unit and the average length of stay in the surgical wards is 10 - 12 days.

91. The unit is reasonably busy but not overloaded. The following tables give an indication of the volume of work undertaken:-

(1)

Year	Arranged Cases	Night Emergencies	Day Emergencies	Total
1957	1,361	101	200	1,662
1958	1,528	110	213	1,851
1959	1,783	124	255	2,162
1960	1,993	140	262	2,395

Table 3

VALE OF LEVEN HOSPITAL
THEATRE USAGE

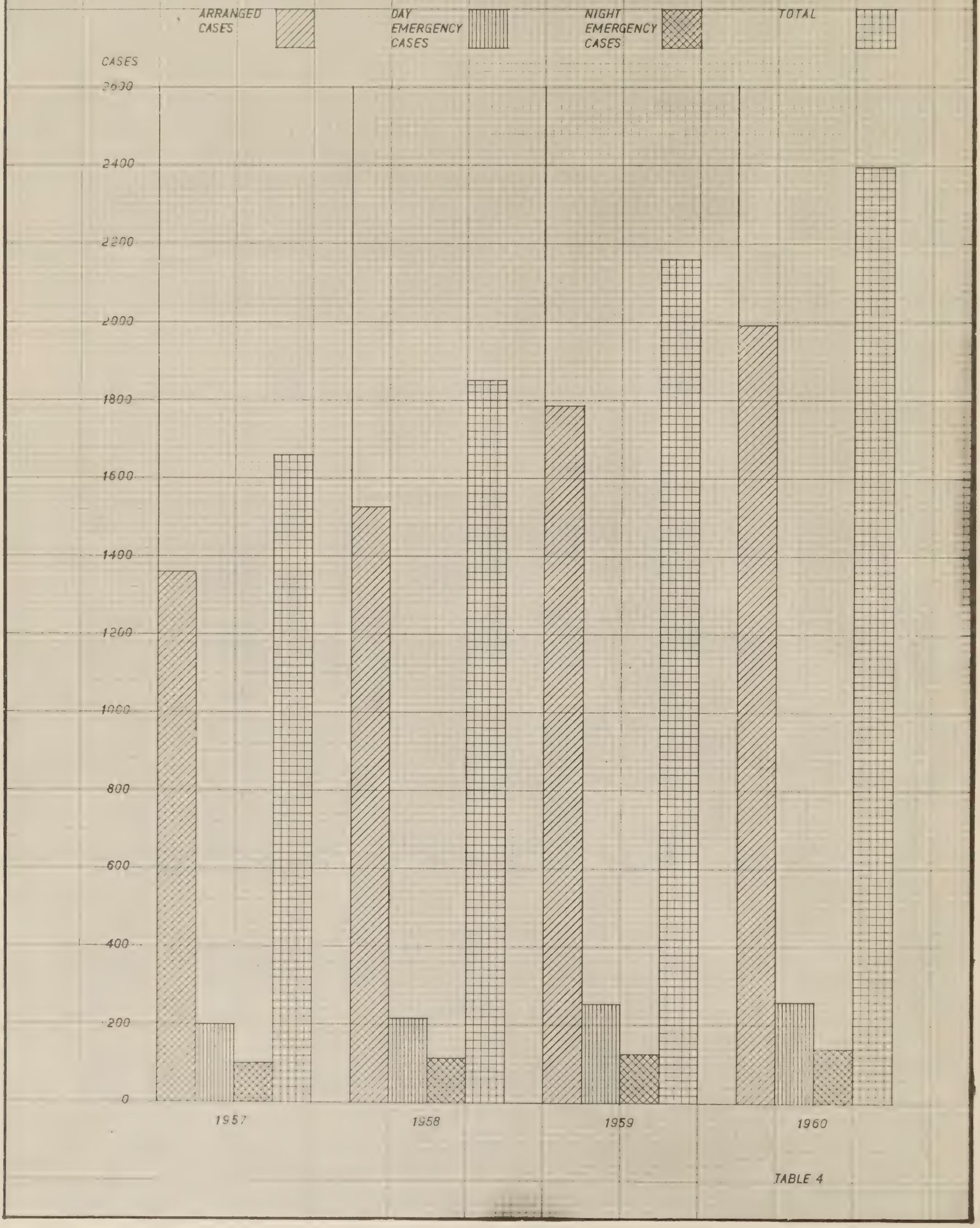
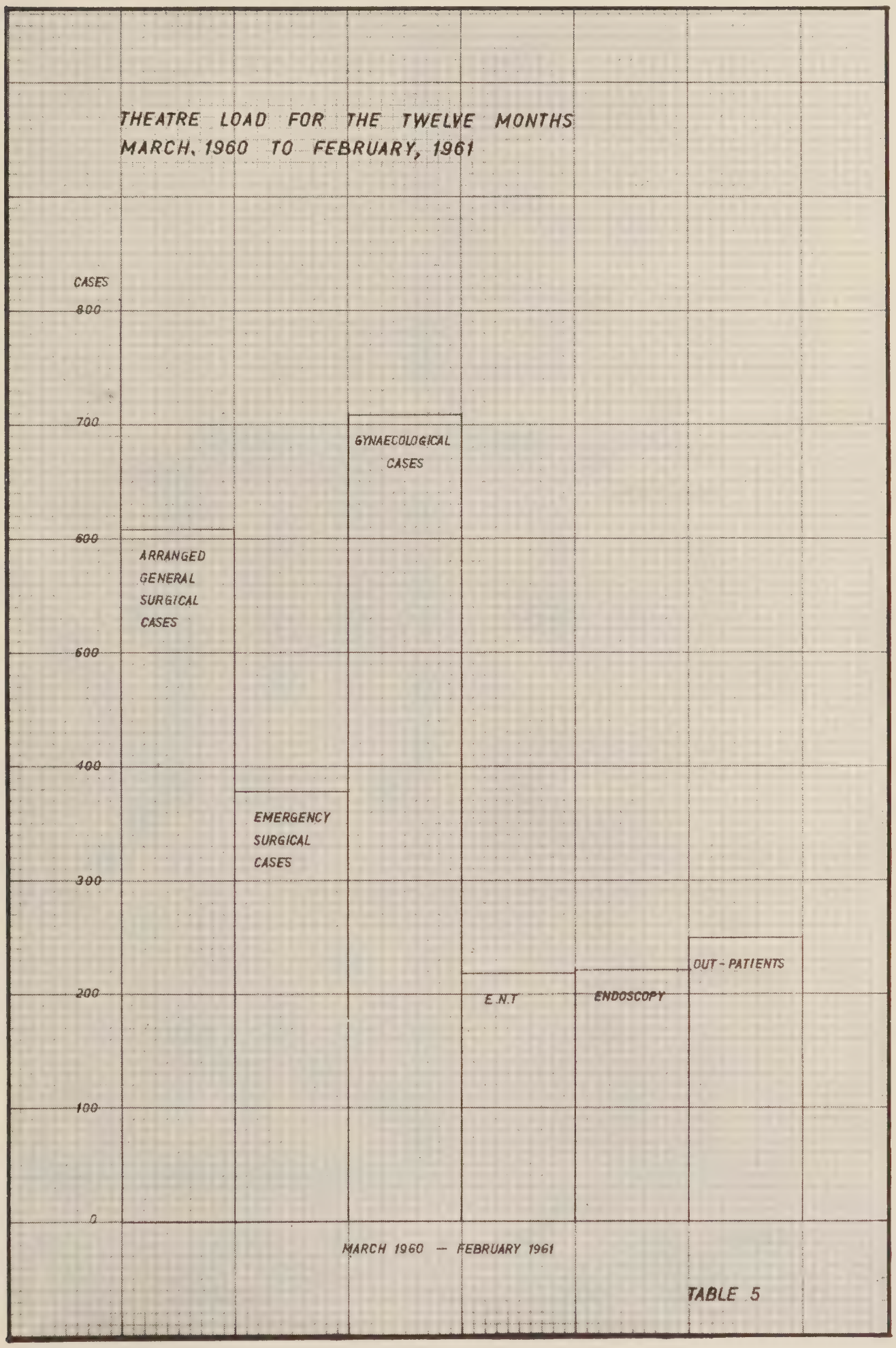


TABLE 4

(2) for the twelve months, March, 1960 to February, 1961, the following details were recorded:-

(a)	Number of arranged general surgical operations on in-patients	608	
(b)	Number of gynaecological operations	709	
(c)	Number of E.N.T. operations	218	
(d)	Number of endoscopy examinations	221	
(e)	Number of operations on out-patients	251	
(f)	Total number of list cases		2,007
(g)	Number of day emergencies	265	
(h)	Number of night emergencies	113	
(i)	Total number of emergencies		378
(j)	Grand total		2,385



It may also be noted that:-

(3) (a) Number of days on which no operations were recorded — 37
(b) Number of days on which only one operation was recorded — 43
(c) The largest number of operations recorded per day — 18 (twice)

92. A note on the mechanical services in the operating theatre suite is given at paragraphs 364-366 of this report.

Detailed description

93. The general layout of rooms is shown at Figure 1 and it will be noted that, apart from a side link between the recovery area and the radiological department, there is a single entrance and exit for all types of traffic. The crossing and overlapping of various routes is clearly shown and the congestion is particularly dense in the hall area outside the doors to the operating areas and near the scrub up basins.

94. The group of rooms at the entrance to the suite from the main corridor is used in a different manner from that originally planned, e.g.:-

(1) The present sister's room was planned as a linen room.

(2) The present linen room was planned as a dressings preparation room.

(3) The present preparation and glove room was planned as the sister's room.

(4) The anaesthetic room is a large room of 190 sq. ft. and was intended to function as a minor operating theatre if required in an emergency. It is situated across the main hall and circulation space from the two operating theatres which it serves. For this reason its location is most unsatisfactory.

95. Staff changing and toilet accommodation is quite inadequate. Six lockers in a room of 130 sq. ft. are allocated to male medical staff and two lockers in a room of 110 sq. ft. to female nursing and medical staff. The male changing room is also used as an office by medical staff. The operating theatre technician and porter require to change in a W.C.

96. The operating areas of 320 and 370 sq. ft. are slightly restricted in floor space and are said to become unduly hot and oppressive at certain times of the year. No detailed study of the engineering services was made. The low ceiling of 9 ft. 6 ins. results in roof fitments being low and awkwardly placed. The switch control panel is badly located in relation to the operating table, the site of which is fixed by the position of the overhead lamp and the need to have it positioned suitably for the turning of trolleys.

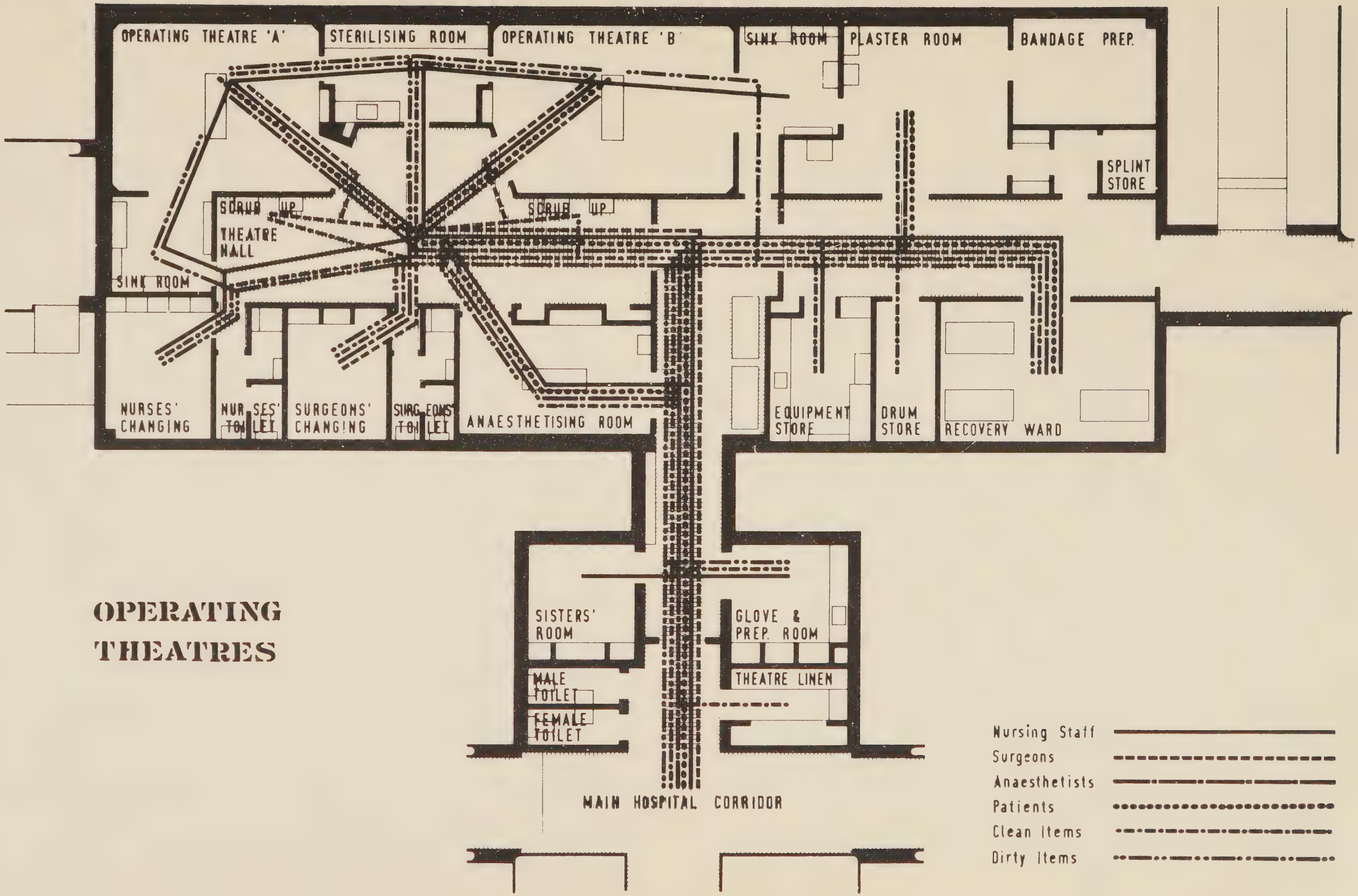
97. The flooring is of terrazzo which is badly cracked.

98. The scrub up rooms as shown in an early plan have been adapted as sink rooms but are not used as such. Scrubbing up is done in the hall and a view of the theatre is gained through a small window above the sinks. This location of the scrub up facilities is not good in relation to the general traffic flow.

99. One sterilising utility room of about 140 sq. ft. serves both theatres and communicates with them and with the main hall. This is not a satisfactory arrangement as sterile items may be under preparation for use in one theatre while dirty instruments are being dealt with from the other. The extract ventilation in this room is inadequate particularly under certain wind conditions.

FIG. 1

OPERATING THEATRES



100. The plaster room is used for a fracture clinic on six occasions each month and for this purpose the side entrance from the X-ray department is used. It is also used occasionally as an additional anaesthetic room. The recovery ward appears to be used mainly as a resuscitation area and for the accommodation of day patients. The storage space for drums and equipment appears adequate; instruments are stored in glass cupboards in each theatre.

Points relevant to future planning

101. No points of particular merit were noted as suitable for inclusion in future plans and, indeed, the use of a pre-determined space to contain the functional requirements of an operating theatre suite does not appear to have proved successful. The main features to be avoided in new schemes are:-

(1) single entrance and exit with crossing of different types of traffic;

(2) single anaesthetic room serving two theatres and its separation from the operating area;

(3) single sterilising utility room opening on to and serving two separate theatres which may be in use at the same time;

(4) location of scrub up facilities in a main circulation area;

(5) inadequacy of changing accommodation for theatre staff;

(6) reported inadequacy of the ventilating system both in the operating areas and in the sterilising utility room.

IV - LABORATORY SERVICES

General description and staffing

102. The accommodation for laboratory services is remarkably good considering that a pronounced increase in work load has been a common experience in this field in recent years and that the various functions to be discharged were fitted into the area of a standard building unit of 100 ft. by 40 ft.

103. The laboratory's space is situated on the first floor of a two-storey block and consists of a series of relatively small rooms on either side of a central corridor. The rooms are all of moderate size and, in depth, are just under or over 17 ft. depending on which side of the corridor they are situated. The 17 rooms which comprise the main laboratory are sufficient for routine activities though unlikely to cope with any additional load. The room originally intended as the Pathologist's laboratory is now used as additional space for biochemistry and a separate room for haematology has proved to be necessary. The volume of work in the department as a whole has increased steadily since the hospital was opened.

104. A fairly full range of basic laboratory services including histology, haematology, bacteriology and biochemistry is provided for the following hospitals:-

	No. of beds
Vale of Leven	149
Henry Brock (Geriatrics)	20
Dumbarton Cottage Hospital	22
Dumbarton General Hospital	45
Dumbarton Central Hospital	75
Overtoun Maternity Hospital	30
Duntocher Hospital	40
Blawarthill Hospital	80
Helensburgh Victoria Infirmary	30
Braeholm Maternity and Antenatal (+ Clinics)	38
Camis Eskan Hospital	42

105. No virology is done, and no tests for pregnancy are diagnosed, but there is a close relationship with the Western Infirmary and Ruchill Hospital, Glasgow for such tests as cannot be undertaken. The Consultant Pathologist aims at a group service catering for the Vale of Leven hospital, a number of smaller hospitals, and for general practitioners in the area. In addition, the examination of milks and waters is to be undertaken.

106. The service to peripheral units and to general practitioners is maintained by a van based at the hospital and which does a daily round. Specimens are received from practitioners in the Vale of Leven, Dumbarton, Clydebank, Helensburgh and part of Argyllshire.

107. Stocks of blood for transfusion are obtained from Law Hospital, Carluke, twice weekly and a 24-hour matching service is maintained for the hospitals served by the laboratory.

108. *Staffing*. The staff consists of

Consultant Clinical Pathologist
Senior Biochemist (B.Sc.)
Senior Technician, Grade I (2)
Senior Technician, Grade II
Technician
Junior Employees or Students (5)

At the time of the review, posts were vacant for
Senior Registrar in Bacteriology
Senior Technician, Grade I

Work load

109. The following table gives an indication of the work load and the way in which it has increased since the laboratory was opened. The figures given for bacteriology, haematology and histology refer to the specimens examined; those for biochemistry indicate the number of tests made. For biochemistry the number of specimens is given for the year 1960.

Year	Bacteriology	Haematology	Histology	Biochemistry
1956	2,496	803	688	-
1957	5,191	3,844	983	-
1958	6,307	4,999	1,155	-
1959	6,429	4,960	1,250	2,125
1960	7,307	7,572	1,592	6,529 (equals 2,726 specimens)

Table 6

110. *Sources of Work*. A comparison between 1956 and 1960 was made, i.e.:-

Year	Sources	Bacteriology	Haematology	Histology	Biochemistry (Tests)
1956	Vale of Leven	1,679	531	453	-
	Other	817	272	235	-
1960	Vale of Leven	4,622	2,864	1,137	5,675
	Other	2,685	4,708	455	854

Table 7

It will be noted from this comparison that there has been a considerable increase in the services provided and a marked variation in the work originating at the Vale of Level Hospital and at other units.

Detailed description

111. Before making notes on each room in the laboratory suite, certain general points may be mentioned.

112. *Heating*. This is effected by ceiling panels which produce comfortable conditions at certain periods of the year. Experience has shown that in sunny weather when heat generating apparatus is in use and windows have to be closed to prevent the disturbance of materials on benches by wind, unpleasant conditions may result.

113. *Floors*. These are covered with Semtex tiles which have not proved entirely satisfactory. The tiles may be loosened by spilled chemicals and static electricity is not absorbed. As regards the latter, it has been found that certain meters may be rendered inaccurate and mild electric shocks have been obtained from touching such apparatus as microscopes.

114. *Windows*. The window pattern is similar to that throughout the hospital and will be described elsewhere in this report. It may be noted, however, that while the large amount of window space makes the laboratories light, it provides an awkward background for certain procedures, e.g. the reading of pipettes when the work benches are fixed parallel to the windows.

115. *Bench Space and Services*. In most of the rooms the area of bench space was regarded by the staff as insufficient. This may have been the result of the limited storage space which had been provided. Experience has shown that the number of electric power points was insufficient.

116. *Storage Space*. The fact that additional storage space has had to be found in areas of the hospital remote from the laboratory for specimens, blocks, records, etc., will be commented upon elsewhere in the report, but it is relevant to note that even with the provision of some dispersed storage accommodation, there was evidence of congestion in all the laboratory rooms in the suite.

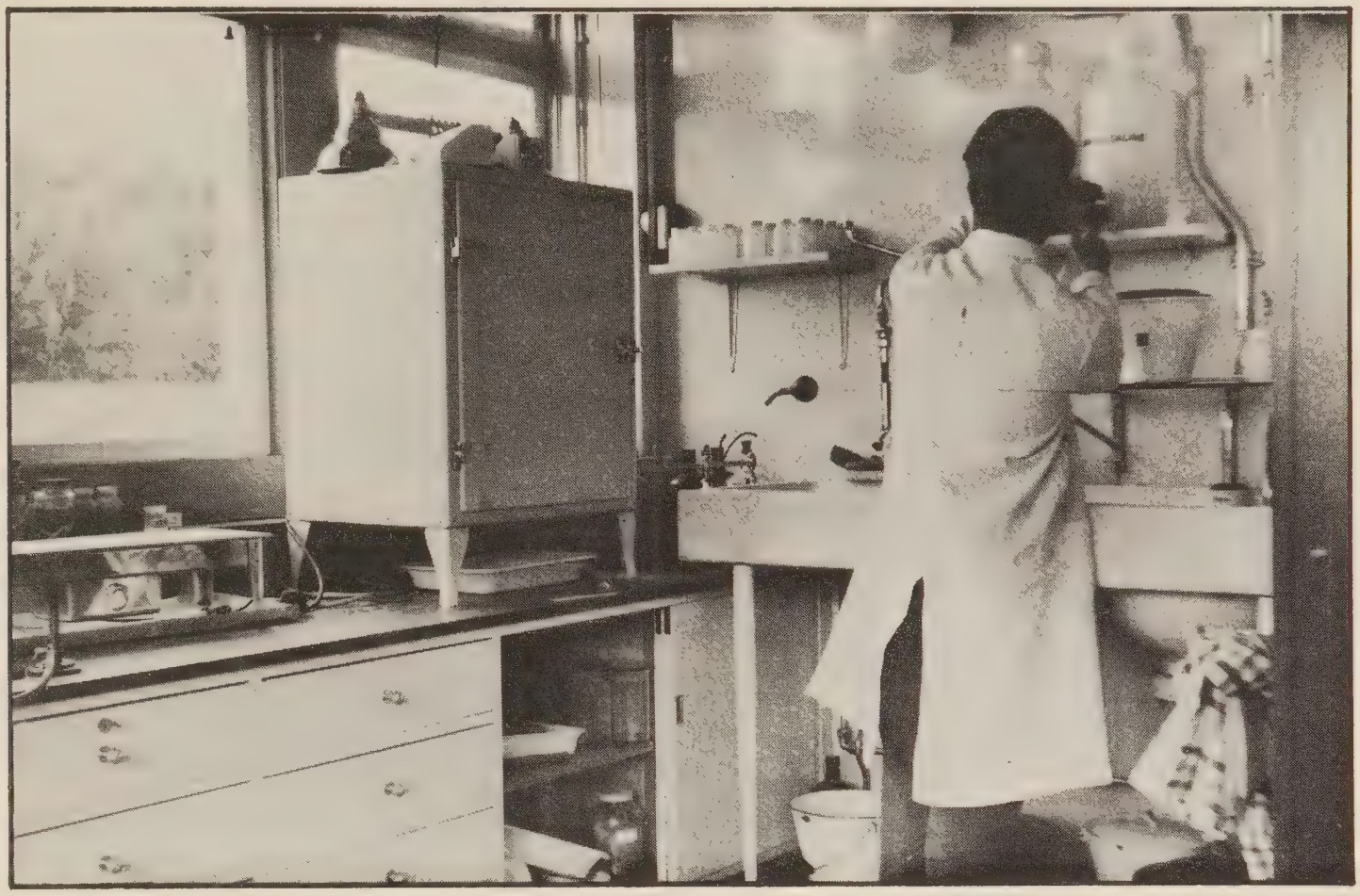
The following comments refer to individual rooms:-

117. *Reception and Office Space*. This room of 270 sq. ft. is conveniently sited at the top of the entrance stairway and appears to be adequate in area for reception, recording, dispatch and the general office work of the unit.

118. *Consultant Pathologist's Office*. This office is also conveniently located near the entrance to the suite. It was originally intended that an adjacent room would also be available to the Consultant Physician as a laboratory but this has had to be added to the space available for biochemistry. Without it the Pathologist's office of 175 sq. ft. is slightly too small for microscopy, storage of records and slides, as well as for general office purposes.

119. *Histology Laboratory*. This laboratory of 220 sq. ft. in which two persons may work, and which contains a total of 30' of wall benchings, would suffice for its purpose if more adequate storage space was available and if a suitably ventilated formalin room or bay were provided. As it is, there is a considerable degree of congestion on the bench space and, although reduced to some extent by the use of a small extract fan, some nuisance

remains from formalin fumes. The provision of only five electric power points was regarded as insufficient.



Photograph 9

120. *Biochemistry Laboratory and Balance Room.* The main laboratory of 260 sq. ft. in floor area, and the adjacent balance room of 70 sq. ft. are overcrowded. The lighting is unevenly distributed in the main laboratory, with none over the two central tables which are 18 sq. ft. and 16 sq. ft. in area. 35 ft. of wall benching is available. The wall switches are

Photograph 10

inconveniently placed, e.g., behind doors or as individual cords which are difficult to find at night. The fume cupboard of 27 sq. ft. is badly designed with the gas taps inside and it is thus necessary for the operators to put their heads into the cupboard before they can reach and turn the taps. The extract fan for the fume cupboard is exceptionally noisy. There is no drainage board at the main sink and, in addition, the arm of the mixer tap is too low to allow large glass receptacles to be filled at it. The water pressure is insufficient for extract purposes. There is no sluice accommodation for the disposal of 24 hour specimens of urine or specimens of faeces and a W.C. at the other end of the laboratory corridor has to be used for this purpose. The largest power point is of 13 amps. which leaves little margin for certain pieces of electrical equipment, e.g., the electric still.

121. The subsidiary laboratory, originally intended for use by the Consultant Pathologist, is some 220 sq. ft. in floor area and with 33' of bench space forms a useful addition to the biochemistry section, though certain pieces of apparatus cannot be put into use at the same time because of a shortage of electrical power points.

122. *Bacteriology*. This room which is over 380 sq. ft. in floor area was originally intended to be the main laboratory area and to include provision for haematology. The whole room is now used for bacteriology and appears to be of adequate though not excessive size for this purpose. It contains an island bench of 40 sq. ft. and 46 ft. of wall benching. The provision of only six power points in this room was regarded as insufficient and the semi-opaque glass wall on the corridor side of the room is regarded as distracting by those working in this laboratory.

123. *Haematology*. Originally no separate room was provided for this work but as the service has developed, the room intended to be the bacteriological laboratory is now utilised for this purpose leaving all the bacteriological work to be done in the main laboratory. This room of 220 sq. ft. in floor area with 37' of bench length is adequate for this work. No specific defects were noted except the absence of a wash-hand basin.

124. *Media, Wash and Sterilising Rooms*. These rooms are grouped together and appear to function satisfactorily. The wash room of 160 sq. ft. is considered slightly too small for the volume of work involved. It contains two sinks and either an additional unit or the introduction of some mechanical washing device is necessary in a laboratory of this size. There are two cleaners; one deals with the washing of glassware and undertakes the cleaning and feeding of the laboratory animals. The other deals primarily with floors and general cleaning duties, and assists with the washing of glassware.

125. The floors in these rooms are unsealed and absorbent making it difficult to remove any staining material.

126. The sterilising room of just over 200 sq. ft. appears to be satisfactory.

127. *Cloakrooms and W.Cs*. Cloakrooms of 165 sq. ft. for male staff and 180 sq. ft. for female staff are provided. Changing facilities and locker provision is inadequate e.g. only two lockers for ten male staff.

128. *Staff Room*. This room of 145 sq. ft. appears to be satisfactory for its purpose.

129. *General Store*. This store of 165 sq. ft. in floor area is adequate and the dexian shelving can be altered to provide still further storage space. A small bench top with a vice is available in this store for minor work. The Hospital Engineer is relied upon to assist in making items such as racks and stands as required, but the senior technician considers that a small workshop would be a useful addition to the laboratory unit. Much of the original glassware is still in stock after five years as large quantities appear to have been ordered.

130. *Refrigerator Room*. This room of 165 sq. ft. contains a refrigerator, a deep freeze, a blood bank cupboard and a high speed centrifuge and appears to be satisfactory.

Laboratory animal accommodation

General description

131. The accommodation consists of 7 rooms and is used much in accordance with the original design. An eighth room, originally intended for operating, is now used as a photographic dark room for general laboratory use. The entire animal house comprises about one third of a standard block. Only guinea pigs are kept and these are used almost exclusively for T.B. work, the volume of which has greatly decreased.

132. In general the accommodation was found to be clean and well kept. With the exception of ventilation of the rooms, the services were satisfactory. The terrazzo walls and floors are easily cleaned and a sufficient number of hose points is available.

Detailed description

133. *Cage washing and disinfecting.* The rooms with a total floor area of 250 sq. ft. are linked by a double ended autoclave. The doors of this autoclave are too heavy for use by female staff. No sink is available for cage washing.

134. These rooms and the dark-room have a common exit duct, and, as the extract arrangements are not sufficiently powerful, smells penetrate throughout the department during the cleaning process.

135. *Infected animal rooms.* Two rooms each 100 sq. ft. in floor area are used for infected animal work. Apart from the absence of an electric power point, they appear to be suitable for this purpose.

136. *Attendants store.* This is a small room of 100 sq. ft. of a general utility type with an annexe containing a sink. It is used for the storage of animals' food and bedding and is sufficient for this purpose.

137. *Quarantine room.* This room of 100 sq. ft. in floor area contains the pens for guinea pigs bought in and requiring quarantine before use. Racks with cages are unnecessary as the number of guinea pigs maintained is small.

138. *Normal animal house.* This room, of 100 sq. ft. is mainly used for breeding guinea pigs; it is the same size as the quarantine room, and contains floor level pens.

Mortuary and post mortem room

139. There has been a marked increase in the number of post-mortem examinations carried out at the hospital in recent years. The figures are:-

1956	1957	1958	1959	1960
20	34	82	120	206

Table 8

This increase is partly a reflection of the interest taken by the Consultant Clinical Pathologist in morbid anatomy.

General description

140. There is one post-mortem theatre with an adjacent ancillary room containing the body refrigerator and which can be used for "viewing" if required. Changing accommodation for the Pathologist and the attendant is available and there is a room near the outside entrance to the mortuary which was intended for religious services. The access to the mortuary from the

hospital is by the lower "service" corridor and up a stairway which has a central trolley ramp. (photograph 11).

Photograph 11

Detailed description

141. The mortuary unit functions as originally planned and with the exception of certain points of detail which are mentioned below, and which might be the subject of improvement, it has proved satisfactory.

142. The changing accommodation is simple and adequate. The p.m. theatre of just over 250 sq. ft. is well ventilated and of ample size. It might with advantage have two tables to save the Pathologist's time on certain occasions. The surface of the floors and walls have not been sealed and any dye or other staining material tends to be absorbed and unless cleaned immediately may leave an indelible mark. The refrigerator is designed to hold six bodies but has only been filled on isolated occasions although it is used also for the geriatric unit at the Henry Brock Hospital. The arrangements for "viewing" by means of a window into one end of the refrigerator room which can be screened off, is said to function satisfactorily but is seldom required. The room of 210 sq. ft. at the entrance to the unit was intended for religious services. It has never been used for this purpose in the past five years but forms a useful waiting area for relatives.

143. The means of transferring bodies from hospital corridor level to the p.m. room and from there to ground level, involves a rather awkward ramp and a short stair. The ramp is difficult to negotiate with a heavily laden trolley and in transporting a coffin from the p.m. suite it is necessary to carry it up the flight of steps.

Points relevant to future planning

144. The main points arising from the survey of the laboratory suite, the animal accommodation, the mortuary and p.m. room are as follows:-

145. *Heating, lighting and ventilation.* In a new unit these require particularly careful consideration. The experience at Vale of Leven hospital has been that even with the subsequent addition of venetian blinds to the

windows exposed to sun, uncomfortably hot conditions can arise in summer and this is difficult to correct when it may be unsuitable to open windows and when the regulation of ceiling heating cannot be made locally. Lighting sources should be carefully related to working areas rather than to the room as a whole. Particular attention should be paid to the ventilation of fume cupboards and the extraction of formalin fumes in the histology laboratory. Adequate facilities for cage washing and sterilising must be provided.

146. *Static electricity.* The absorption of static electricity is a matter of considerable importance in laboratory areas particularly where delicate meters of various kinds may be employed.

147. *Power points.* The survey of Vale of Leven emphasises the need for the careful location of power points when a laboratory building is being planned.

148. *Drainage.* The need for a sluice sink for the disposal of specimens should not be overlooked.

149. *Wash hand basins.* The lack of wash hand basins in certain laboratory areas was noted.

150. *Storage space.* This is of particular importance, particularly after a laboratory has been in use for some years. An estimate of the anticipated requirements should be made at the planning stage of every new laboratory not only in relation to records, blocks, slides, etc., but also as regards inflammable materials, reagents, instruments, etc.

151. *Workshop.* Even in a laboratory serving a medium-size hospital, a small workshop would be an advantage.

152. *Darkroom.* Unless suitable central photography facilities are provided at a hospital, a darkroom is likely to be required in the laboratory area and this is well illustrated by the experience at Vale of Leven hospital.

153. *Accommodation for out-patients.* The lack of any accommodation for out-patients has been found to be a disadvantage at Vale of Leven hospital. Out-patients are not particularly encouraged in the laboratory area but nevertheless a few cases do require to attend the laboratory and a small amount of accommodation would be an advantage and might comprise a small waiting room, consulting/examination room and lavatory accommodation.

154. *Rooms for special purposes.* In addition to e.g., a photographic darkroom, rooms for out-patient accommodation, etc., as mentioned above, it is unlikely that with two laboratory areas for biochemistry, and with the development of more enclosed techniques, e.g., in chromatography, further rooms for special purposes would be required at a medium-size unit. A room for special instruments would be an advantage and this could be achieved by having a larger balance room than is available at Vale of Leven hospital. The dispensing or synthesis of radio-active isotopes are unlikely to be undertaken at hospitals of this size and no special provision would be required.

V - PHARMACY

General description and staffing

155. The pharmacy was intended to serve only the Vale of Leven Hospital but now supplies eleven separate units. It occupies an area of some 1,100 sq. ft. which is slightly more than a quarter of a standard building unit; 270 sq. ft. of general storage space and an improvised disinfectant store in the basement have been added. The layout was conditioned at the outset by the size of the standard building unit rather than the particular requirements of the department and, while it functions reasonably well, it is cramped for area and should not be taken as a model for future plans.

156. The staff consists of:

Chief Pharmacist	1
Senior Pharmacist	1
Assistant in Dispensing	1
Domestic	1

157. The services of a typist and a driver are shared with the laboratory. Porter service is obtained from the central pool. This staff is regarded as adequate for the present load of work.

158. The Chief Pharmacist has a considerable amount of clerical work to do in relation to general correspondence, indents for supplies, stock control, and such additional work as, e.g., lectures. She now receives assistance from the hospital typing pool but considers that full-time clerical assistance is necessary.

159. There is a daily delivery round from the pharmacy to the consumer units at Vale of Leven, and a less frequent service to other units by van.

Detailed description

160. *Chief Pharmacist's office*. This is an exceedingly small room of some 48 sq. ft. and is much too small to serve adequately as an office.

Photograph 12

161. *Dispensary*. This room is some 390 sq. ft. in floor area. It is well lit, serviced, and equipped, and the cork flooring is good. The room opens on to the central service area by means of a hatchway, which is seldom used, and by a series of double-ended compartments which form the night emergency service and which function effectively. Another series of double-ended cupboards were designed to give access between the dispensary and a corridor and were intended for items to be collected by ward staff when the pharmacy was closed. These compartments have not proved necessary and are now used as general storage space.

162. *Sterile Products Rooms*. These are two cubicles each about 45 sq. ft. which open off the dispensary and have been located as far as possible

from the main door and service hatch. One room is used for preparation and the other for aseptic work. They have terrazzo floors, but the corners have not been rounded to facilitate cleaning and the under bench space has not been enclosed. These cubicles are small but the facilities appear to be adequate for present demands.

163. *Drug Store*. This room of some 190 sq. ft. is used for the storage of both current and reserve stocks which are separated only by a bank of shelves. This is an unsatisfactory arrangement. An opening has recently been made to link this room with what was originally designed as the bulk store (Photograph 13). This will be a considerable improvement although it will create another means of access to the items in stock.

Photograph 13

164. *Bulk Store*. This room, of 170 sq. ft. is now used for the packing of ward baskets and containers for other units and with the linking of this room and the drug store, the congestion in the dispensary is somewhat relieved. Storage in this room is neatly and effectively arranged.

165. *Spirit and Cylinder Stores*. These are 125 and 135 sq. ft. in floor area respectively and function satisfactorily.

166. *General pharmacy store*. This area of some 270 sq. ft. is used as a bulk store and is a partitioned-off space at one end of the general hospital stores. Here stores are received, opened, and checked, as well as stored. This area is too small for these functions and is too distant from the main pharmacy department.

167. *Disinfectant Store*. This is an improvised area using an under-stair space in the basement. The inconvenient siting involves work in a general circulation space and the carrying of heavy containers up and down stairs.

Points relevant to future planning

168. The need for functional requirements to be decided at the earliest stage of planning and, if possible, the extent of the service to be

provided, is well illustrated by this unit which has had to be extended and even so is restricted in space.

169. Specific deficiencies which might be corrected in the planning of a new unit are:-

(a) There is no goods receipt area;

(b) There are no facilities for bottle washing, drying or storing;

(c) The office space is inadequate;

(d) Reserve stock and current stores should not be accommodated in one room;

(e) There is no disinfectant store;

(f) There is one shared W.C. and no separate staff room.

VI - CENTRAL STERILISING

170. There is no central sterile supply department for general supplies but an area of some 500 sq. ft. is available for sterilising purposes and is equipped with one large, three medium, and one small, steam autoclaves all of the downward displacement type. These autoclaves are used by members of the theatre staff for the sterilisation of theatre materials and by members of the portering staff for items used in other areas of the hospital. These autoclaves are now out of date and if a more modern installation were to be made available as an extension to the operating theatre suite, it might be advisable to re-equip this area for the provision of sterile supplies for the Dunbartonshire Group of Hospitals or as a depot and distributing store for sterile packs received from a C.S.S.D. elsewhere.

VII - SYRINGE SERVICE

General description and staffing

171. Syringes and needles are sterilised and supplied to a total of seven hospitals in the Vale of Leven group, and this service is undertaken in a room some 300 sq. ft. in floor area situated next to the space originally intended for central sterilising. The unit is under the general supervision of the Consultant Pathologist and is in the immediate charge of a technician who was trained by the sister in charge of the out-patient department and who has, in turn, trained her two assistants. These three locally trained workers are employed from 9 a.m. to 3.30 p.m. for five days a week and 9 a.m. to mid-day on Saturdays.

172. Syringes are collected from and delivered to the wards and other departments of the Vale of Leven Hospital once a day by a member of the syringe service staff. The original intention appears to have been that supplies would be collected from a window opening on to the central supply hall but this system has never been implemented.

Detailed description

173. The Department has one hot air oven which is used for drying syringes and two similar ovens which are used for sterilising. The output of syringes does not reach the capacity of this equipment. During January, 1960, the requirement for Vale of Leven Hospital was 86 syringes; in January, 1961,

it was 97 syringes and for the seven hospitals in the group the daily average for 1961 was 165 syringes whereas the sterilising ovens have a total capacity of 300 syringes an hour, i.e., 2,400 syringes in an eight hour day.

174. The layout of the department appears to be satisfactory and the staff is adequate for the present load of work. Ventilation is rather poor in spite of the presence of a Ventaxia fan. The windows are of opaque glass and afford little outlook to the staff in the department.

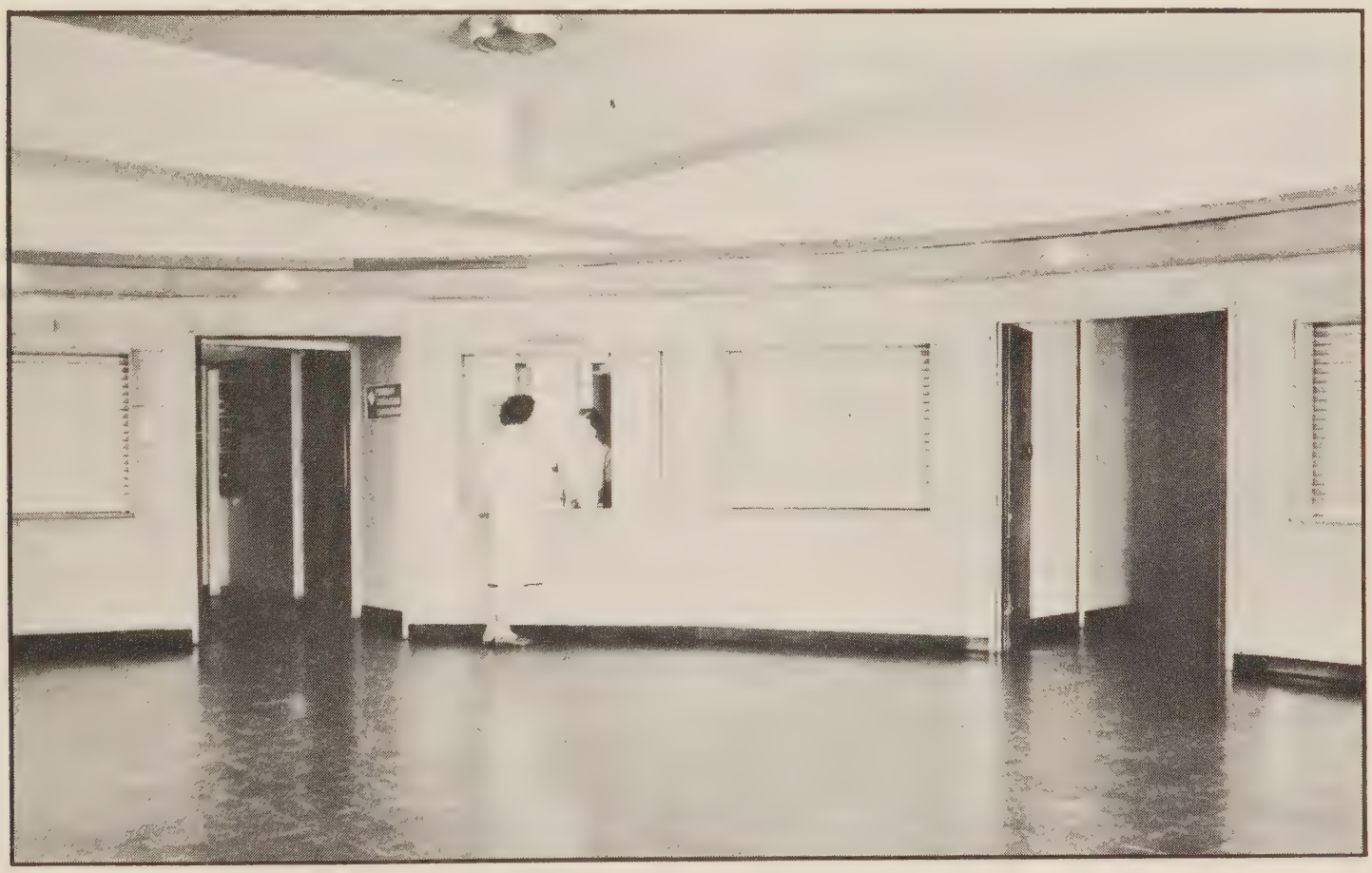
Points relevant to future planning

175. Whether or not a unit of this kind should be incorporated in future hospital plans as a separate entity from a C.S.S.D. appears open to doubt in so far as the increased use of disposable syringes and needles appears to be certain and as it may prove more economical to obtain sterilised supplies direct from commercial sources.

VIII - CENTRAL SUPPLY AREA

Description

176. The central supply area is a large circular hall with hatches intended for the issue of stores from the sterilising area, the pharmacy, the linen room and the central stores. This concept formed a most attractive feature of the hospital when it was planned and the intention was that almost all supplies should be drawn from this central point which is no more than



Photograph 14

some 100 yds. from the furthest part of the hospital. In practice, however, this system does not work except to a limited extent in the pharmacy department and the syringe service. It appears that the detailed implication of the design assumptions were not anticipated correctly in relation to staffing and this method was not established because the hospital was brought into use in stages with a limited staff at the outset. By the time a fuller range of work was being undertaken alternative methods for the supply service were established.

177. The use of central supply issuing counters presupposed that the goods delivered at them would be collected by personnel from the wards or by a porter for delivery to the ward. In view of the distances involved this was impracticable with a limited nursing staff, and difficulties were envisaged in the use of porters for work which would require the checking of supplies when received at the central area, and again when delivered at the ward or other consuming unit. In relation to general stores, it would have been difficult to serve a hatchway opening on to the central area for any considerable period of time as only two storekeepers are employed and their office and reception area is at the far end of the store, while a second store involving a considerable amount of the storekeepers' time is also maintained upstairs.

Points relevant to future planning

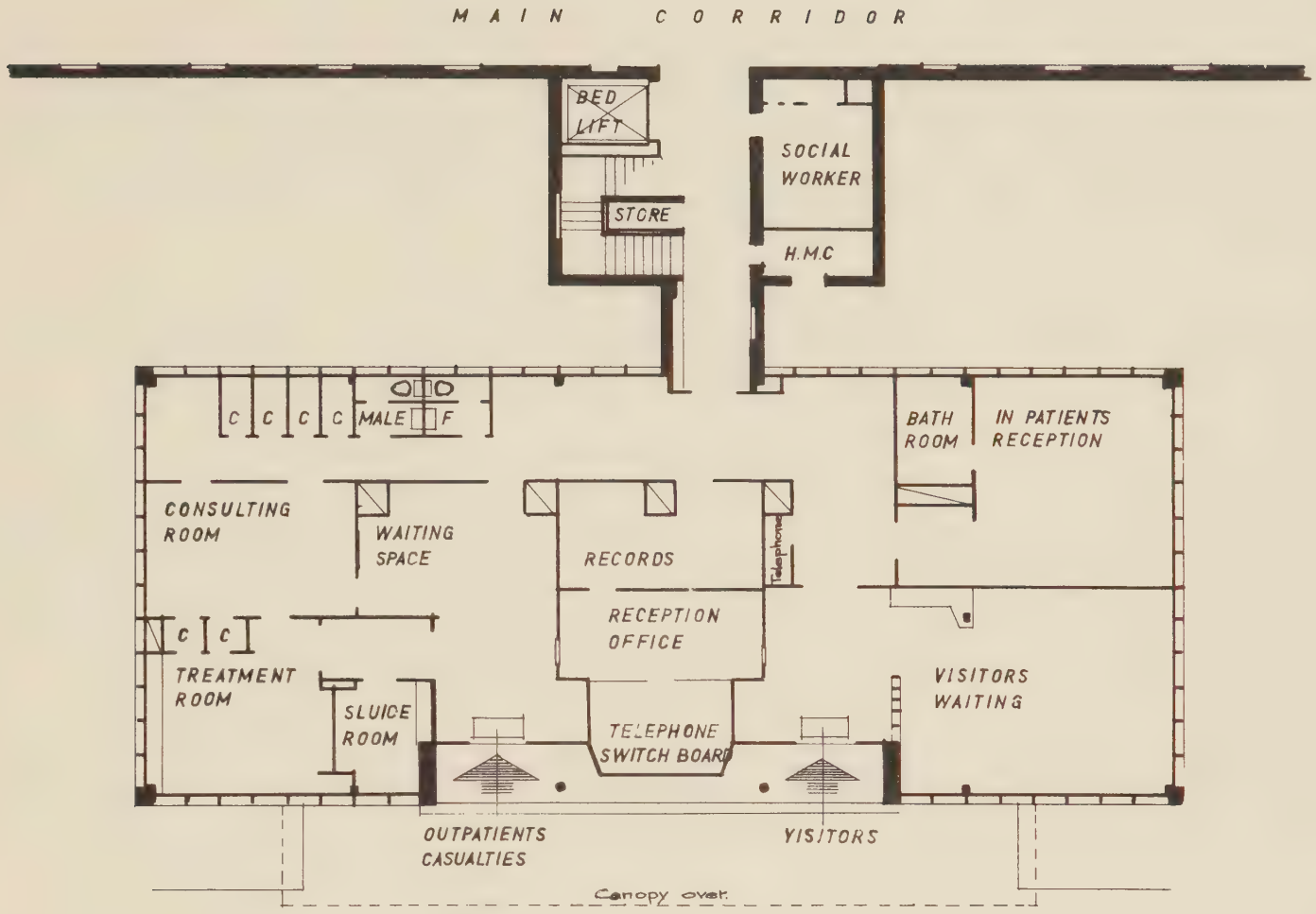
178. It would appear that a central stores issuing area of the kind originally envisaged for Vale of Leven Hospital is unlikely to prove successful unless the exact detail of the method of delivery and collection from the various areas to the consuming units is agreed in advance. The use of nursing staff for the collection of stores is to be deprecated. It is possible, however, that if a pneumatic dispatch system had been available at the time when the Vale of Leven Hospital was planned it might have been incorporated in a scheme for the distribution of supplies, though this might not have been economical if a supplementary distribution for larger items had also to be maintained.

IX - OUT-PATIENT AND CASUALTY DEPARTMENTS

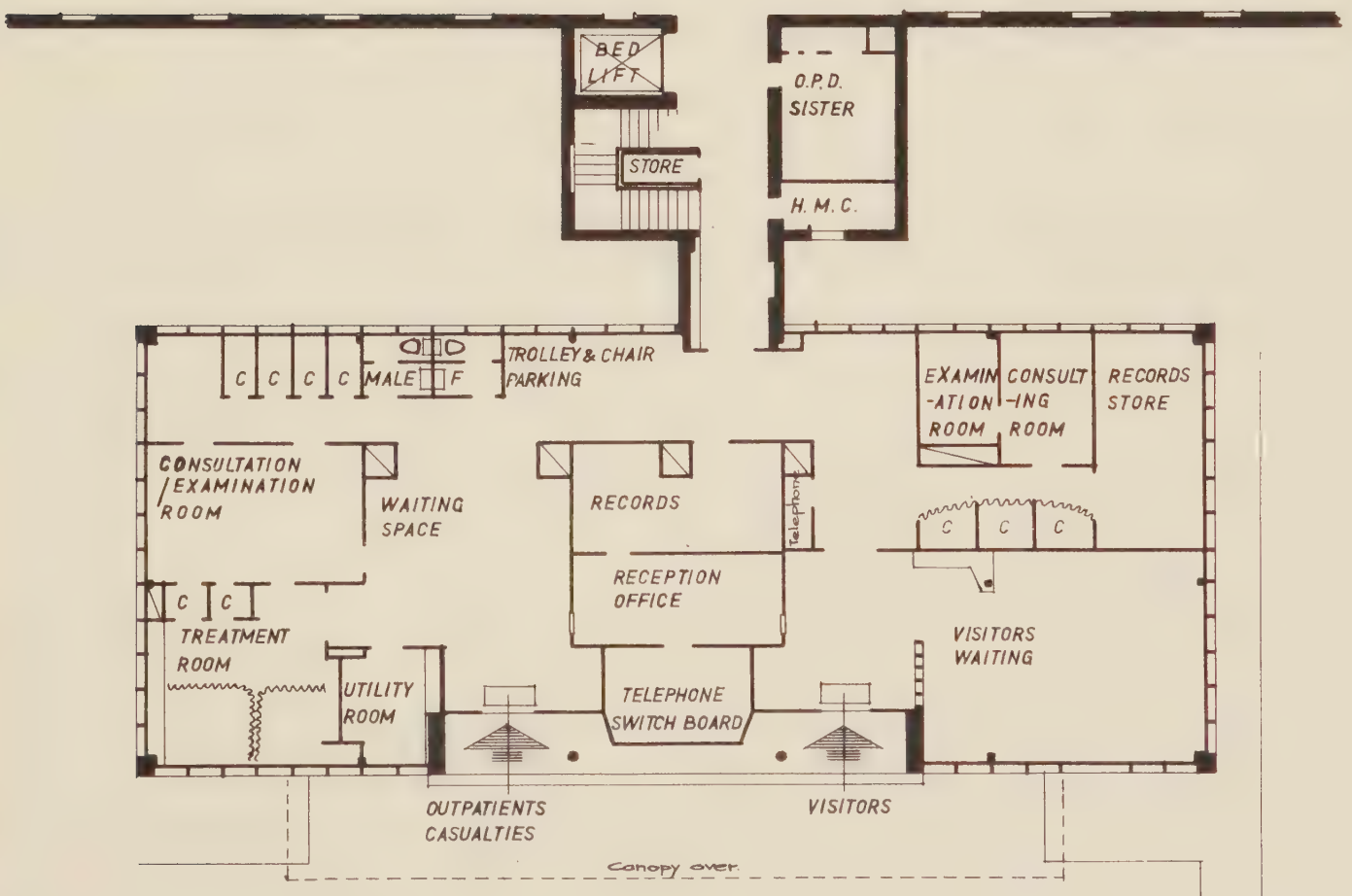
Description

179. The out-patient and casualty departments are situated in part of the standard building unit of 100 ft. x 40 ft. which forms the main entrance to the hospital for patients and visitors. Certain modifications have been made in the use of this accommodation and the changes are illustrated by the following diagrams:-

VALE OF LEVEN HOSPITAL



ORIGINAL LAYOUT



PRESENT LAYOUT OF OUT-PATIENT AND CASUALTY

180. *Out-patient department*. As it was envisaged that the out-patient load would be small, this department consisted originally of a single consultation/examination room located behind the casualty department, with four undressing cubicles across a corridor. When additional accommodation became necessary, part of what had been planned as an admission unit was used to provide a records store, another consulting room, and an examination room with three undressing cubicles. A waiting space of 545 sq. ft. is shared by the original out-patient and casualty departments. Patients waiting to be seen in the out-patient accommodation subsequently provided share a waiting space with hospital visitors. An area is available at the back of the unit for parking trolleys and wheel chairs. Four trolleys and six chairs are normally kept in this area.

181. There is one W.C. for males and one for females. These are inconvenient in design. They are too narrow and the doors open inwards. It is impossible for wheelchairs to be used in these areas.

182. A room of 150 sq. ft. in the link between the out-patient block and the main hospital corridor was intended for an almoner, but is used by the sister in charge of the out-patient and casualty area. For some years social work has been undertaken by health visitors from the M.O.H's. office, but in January 1961 an almoner was appointed to the hospital. As the room originally planned for her use has now become established as the out-patient sister's office she is based at the Henry Brock Hospital.

183. Out-patient consultative clinics are held in the specialties of medicine, surgery, orthopaedics, E.N.T. surgery and dermatology. For 1960 the total number of attendances at these clinics was:-

New cases	2,722
Return cases	6,276
Total	8,998

184. Out-patient work is also recorded under the following headings:-

Physiotherapy	-	total for 1960	8,999
Radiotherapy	-	" " "	185
Haematology	-	" " "	415
X-Ray	-	" " "	5,361

185. Including 9,546 attendances at the Casualty Department, a grand total of 33,504 attendances is reached for 1960 and this may be compared with previous years as follows:-

Year	New Cases	Return Cases	Total
1956	3,998	7,553	11,551
1957	8,956	18,863	27,819
1958	15,482	20.770	31,252
1959	12,299	20,823	33,122
1960	13,006	20,498	33,504

Table 9

186. *Casualty Department.* In 1960 the number of cases treated was:-

New cases	3,900
Return cases	5,646
Total	9,546

187. The department is conveniently located at one entrance to the hospital. Originally, the facilities for casualty work consisted of an examination/treatment room and an adjacent small general utility room. The treatment room has been sub-divided into three parts:-

(a) An examination/treatment room of 230 sq. ft.

(b) A preparation and storage area of about 90 sq. ft.

(c) Two cubicles.

188. This room is suitable in size for the present work load, but adequate privacy for patients cannot be ensured. Waiting facilities consist of an exposed row of 12 chairs just inside the main entrance and a sub-waiting space has been created by placing a chair inside the treatment room. The use of a single utility room as a sluice, disposal and sterilising area is unsatisfactory. As there is no operating theatre in this department, the main theatre suite has to be used for any casualty or out-patient surgery.

189. There is no accommodation for porters in this area of the hospital and the porters' station is in the main hospital corridor some 60 yards away from the out-patient and casualty entrance.

Points relevant to future planning

190. Auditory and visual privacy for patients are desirable in out-patient and casualty units.

191. The layout should provide for an efficient traffic flow and it is unsatisfactory to have several lines of traffic converging on a consultation/examination room. The original consulting room for out-patients at Vale of Leven Hospital has no fewer than six doors opening into it.

192. The provision of a combined sluice, sterilising and disposal room is unsatisfactory.

193. If a system of out-patient work based on separate undressing cubicles is used, it is important that the cubicles communicate directly with the examination room.

194. Toilet facilities should be adequate in number and be large enough to permit the entry and turning of a wheel chair.

195. A porters' station should be located near the entrance to the casualty and out-patient department.

X - RADIOLOGY DEPARTMENT

General description

196. The radiology and physiotherapy departments are contained in one standard building unit and are more conveniently sited for the ward units than for the casualty and out-patient departments.

197. The accommodation consists of:-

Waiting room, shared with the physiotherapy department.
Special waiting area - used for trolley patients.
Two x-ray rooms - each with three changing cubicles.
Portable x-ray room - used for minor injuries.
Developing room - shared by both x-ray rooms.
Viewing bay - shared by both x-ray rooms.
Radiologist's room.
Radiographers' room.
Office - used for viewing, reporting, trimming and packing of films.
Filing room for films.
Barium kitchen.
Staff W.C.
Patients W.C.

198. *Equipment*. The following equipment is in use:-

2 Major X-ray sets: 1 Screening Set	Philips 500 M.A. 100 KV.
3 Portable X-ray units:	1 Philips 20 M.A. 80 KW. 2 Philips 500 M.A. 100 KW.
3 Newton Victor Units.	

199. *Staff*. One radiologist works four half-day sessions per week, and three radiographers with one dark-room attendant work full-time.

200. *Work Load*. The department deals with in-patients and out-patients from the Vale of Leven Hospital and from other hospitals in the Group which have no X-ray facilities. The load varies from 50-60 patients per day and the following tables give the number of patients for 1956, 1958 and 1960, and an indication of the range of investigations undertaken.

Number of X-ray examinations

	1956			1958			1960		
	In-Patients	Out-Patients	Total	In-Patients	Out-Patients	Total	In-Patients	Out-Patients	Total
January	3	33	36	114	321	435	150	389	539
February	35	30	65	125	295	420	138	438	576
March	34	74	108	104	321	425	131	536	667
April	37	77	114	128	368	496	119	446	565
May	45	111	156	116	382	500	160	444	604
June	50	123	173	130	379	509	154	465	619
July	47	106	153	131	322	453	151	357	508
August	52	119	171	107	284	391	154	525	679
September	58	155	213	135	365	498	116	463	579
October	95	248	343	132	382	514	145	445	590
November	128	328	456	129	344	473	156	459	615
December	136	237	373	133	332	465	130	394	524
TOTAL	720	1,641	2,361	1,484	4,095	5,579	1,704	5,361	7,065

Table 10

VALE OF LEVEN HOSPITAL
X-RAY EXAMINATIONS 1956 1958 AND 1960

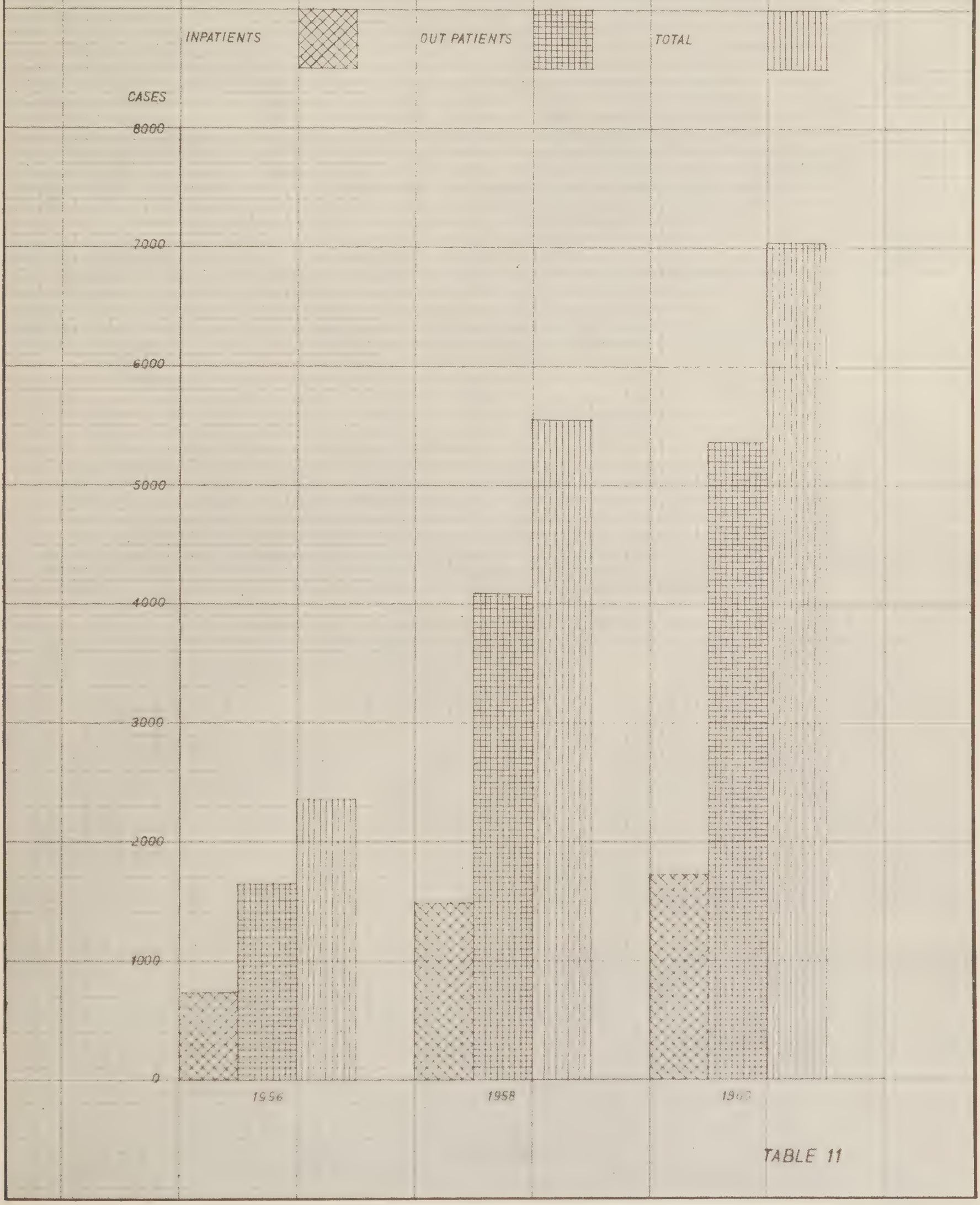


TABLE 11

Types of X-ray examination, 1960

	Barium	Gall Bladder	Biligrafin	I.V.P.	Retrograde Pyelogram	Salphinogram	Cysto-Urethrogram	Placental Localisation	Pelvimetry	Emergency (Casualty)	Cystogram
January	56	6	1	22	-	2	4	3	2	56	1
February	71	6	1	25	3	-	1	5	2	52	3
March	68	7	1	21	3	-	1	3	2	41	3
April	68	13	1	21	6	2	2	2	-	58	1
May	57	6	1	26	6	1	-	4	2	62	2
June	73	15	-	22	4	3	1	-	9	46	-
July	73	7	1	21	1	1	3	3	2	75	-
August	56	6	3	25	3	2	2	5	2	100	3
September	53	7	1	23	4	-	-	3	2	73	-
October	79	8	3	21	4	2	5	2	6	52	1
November	74	9	1	30	4	3	1	7	8	43	-
December	54	15	5	11	-	2	-	4	5	64	1
TOTAL	782	105	19	268	38	18	20	41	42	722	15

Table 12

Detailed description

201. The X-ray rooms of 370 sq. ft. appear to be adequate in size but the changing cubicles of about 20 sq. ft. are too small. They have poor lighting and ventilation and no storage space for patients' belongings. Three cubicles serving each X-ray room are insufficient as all of them may be used as waiting areas at one time by patients who are undressed and waiting for films to be developed. It is considered that five cubicles per X-ray room are necessary.

202. The waiting space of 215 sq. ft. shared with the physiotherapy department appears to be adequate in size for the present load. The need for the trolley waiting bay of 50 sq. ft. is doubtful as patients on trolleys are normally taken straight into one of the X-ray rooms.

203. The developing room and viewing area appear to function satisfactorily and the office accommodation is adequate. The storage space of 550 sq. ft. in the department is very limited and it has been found necessary to use a room in the basement of the hospital for the storage of used films. The patients' toilets are well sited in relation to the rest of the unit but are not equipped with wash hand basins. There is no staff changing room and the electric switching room is being used for this purpose by the staff of both the radiology and physiotherapy departments.

Points relevant to future planning

204. Apart from the inadequate number and size of the changing cubicles for patients, the lack of storage space, and the unsatisfactory changing room facilities for staff this unit appears to function satisfactorily for the load of work undertaken.

XI - PHYSIOTHERAPY DEPARTMENT

General description

205. The physiotherapy department is contained in the same standard building unit as the radiology department and consists of:-

Waiting room - shared with the radiology department.

Treatment room with five cubicles.

Gymnasium.

Wash room - used for foot-baths.

Staff W.C.

Domestic service room; also used as a sluice room.

Office.

Wax treatment room.

Electric switch room - used as a staff changing room.

206. The department deals with in-patients and out-patients from the Vale of Leven Hospital, the Victoria Hospital, Helensburgh, and the geriatric unit at the Camis Eskan Hospital. There is a staff of seven physiotherapists, but only three work in the department at one time. The others do in-patient treatments in the three hospitals on a rota system.

207. *Work Load.* The load of work varies between 60-80 patients treated per day. The total number of in-patients and out-patients from the three hospitals in January 1961 was 1,233.

208. The following table gives the number of out-patients treated for Vale of Leven Hospital in 1960:-

Month	First Attendances	Subsequent Attendances	Total
January	51	642	693
February	61	649	710
March	69	900	969
April	61	828	889
May	45	799	844
June	50	721	771
July	37	558	595
August	51	620	671
September	56	666	722
October	45	745	790
November	48	664	712
December	34	599	633
TOTAL	608	8,391	8,999

Table 13

Detailed description

209. *The Waiting Room.* This room of 215 sq. ft. is shared with the radiology department and appears to be adequate in area. Wheel chairs and trolleys have no separate parking space and are kept either in the treatment room or in the corridor.

210. *Treatment Room.* This room of 560 sq. ft. is divided into five cubicled areas. When the cubicle curtains are pulled the lighting is poor and artificial light has to be used throughout the day. The curtains are hung too near the ceiling and do not provide adequate privacy at the foot. The room is difficult to ventilate as there are windows only on one side and these are directly above the treatment couches. No cloakroom or undressing facilities have been provided for patients and part of the treatment room has had to be used for this purpose.

211. *Gymnasium.* The room used as a gymnasium occupies an area of 265 sq. ft.; it is too small for this purpose, and the effective space is reduced by the storage of bulky equipment. This equipment cannot be properly used in the area available and the room is too small to allow group therapy to be undertaken. No more than two patients can be treated in it at one time.

212. *Wash Room.* This room of 25 sq. ft. was intended to be the domestic service room but has been converted for foot baths. It is wrongly sited for this purpose as patients have to walk from it along the corridor to reach the room in which wax treatments are given. It is too small to accommodate a wheel-chair.

213. *Staff W.C.* This W.C. is kept entirely for the staff of the physiotherapy department and no toilet facilities are available for patients. There is a staff w.c. in the adjacent X-ray department but there is no sharing of this accommodation between the two units.

214. *Domestic Service Room.* This room of 30 sq. ft. was designed as a sluice room but now serves as a domestic service room as well.

215. *Office.* This room of 85 sq. ft. may have to accommodate three people at one time and is insufficient for the office requirements of the department.

216. *Wax Treatment Room.* This room of 55 sq. ft. was intended as an office and has been converted for use as a wax treatment room. It is most inadequate for this purpose. It cannot accommodate a wheel chair, it is poorly lighted and ventilated, and patients require to walk some 30 ft. along the main corridor and past three other rooms after having had a foot-bath.

217. *Electric Switch Room.* This room of 60 sq. ft. is used as a changing room by staff from the physiotherapy and radiology departments as no other facilities are provided. It has no wash-hand basin, poor lighting and ventilation and is altogether quite inadequate as a changing room.

Points relevant to future planning

218. The use of one standard building unit to accommodate two departments may lead to one being used as an entrance corridor for the other and this leads to congestion of traffic.

219. The amount of storage space required for bulky equipment should be carefully assessed.

220. Suitable changing and toilet facilities for patients should be provided.

221. Rooms containing facilities used consecutively should be adjacent.

222. The gymnasium should be large enough for group therapy to be possible.

223. Suitable changing-room accommodation for staff should be available.

XII - KITCHEN

General description

224. The central kitchen was designed to provide meals for 600 people in an emergency and for this reason it is over spacious for its present function. With ancillary rooms such as stores and offices, the unit is about 7,000 sq. ft. in floor area. It is conveniently sited for the distribution of meals to the wards and dining rooms but is a source of considerable noise to the two wards on the same level.

225. Meals are distributed to wards in heated food-trolleys and a large parking area, which could accommodate at least double the number of trolleys in use, is provided at the entrance to the kitchen.

Photograph 15

226. A total staff of 15 cooks and kitchen maids is employed. Changing and toilet accommodation for the staff is at a considerable distance and on a lower storey. There is no dietitian and patients are given no choice of menu.

Detailed description

227. A full range of kitchen equipment is installed, with both gas and electric power. Separate bays are provided for the preparation and cooking of individual types of food.

Photograph 16

228. The spacious layout leads to a considerable amount of walking in the assembling of meals. The design of some storage bins and the use of large vegetable tubs entails more heavy lifting and carrying than is necessary.

229. A separate unit for dishwashing functions satisfactorily but the adjacent area for cutlery washing has never been used.

Points relevant to future planning

230. Having been designed to cope with about three times the present load it is not possible to draw detailed conclusions from the experience at Vale of Leven Hospital. Points of a general kind to be borne in mind are:-

(1) Walking distances for kitchen staff should not be excessive.

(2) Heavy lifting and carrying should be minimised by the design of storage bins and the use of mechanical aids.

(3) Noise from equipment should be reduced as far as possible. It should not reach ward units from the kitchen.

(4) Suitable toilet and changing accommodation for staff is essential.

XIII - DINING ROOM AND CANTEEN

Description

231. The main dining rooms, domestic staff dining room and the canteen are close to the kitchen, and on the same level.

232. The canteen of 330 sq. ft. is used mainly by those who want a quick service meal. It serves a useful function in this respect but is only occasionally used by medical staff.

233. The main dining room of 545 sq. ft., now used by medical and nursing staff, was designed for nursing staff only. The room is barely adequate in size for the numbers involved, and meals require to be served in several sittings.

234. The domestic staff dining room of 190 sq. ft. is used by four supervisors and is larger than necessary for this number.

Points relevant to future planning

235. It is important to estimate as accurately as possible the numbers for whom facilities will be required and the geographical position of the hospital is important in this respect.

236. The area of dining space to be provided will depend on whether various categories of staff are to be served in separate rooms and whether a cafeteria system is to be adopted.

XIV - LAUNDRY AND SEWING ROOM

General description of laundry

237. The laundry is conveniently situated at ground floor level and the overall space of 4,300 sq. ft. appears to be adequate to cope with the

present load of 20,000 articles per week. The building is well lit and satisfactorily ventilated. At the time of the survey alterations were being undertaken to improve the design of the laundry on a work flow basis, and to install some new machines.

238. The staff consists of one supervisor, one assistant supervisor, 16 female laundry workers and one driver, all of whom work a 5-day week.

239. The laundry serves the following hospitals -

Vale of Leven Hospital
Henry Brock Hospital
Dumbarton Cottage Hospital
Dumbarton Infectious Diseases Hospital
Braeholm Maternity Hospital
Victoria Hospital, Helensburgh
Duntocher)
Blawarthill) Geriatric Units.
Camis Eskan)

Detailed description of laundry

240. The following equipment is in present use:-

4 Washing Machines
2 Hydro extractors
3 Tumbler driers
3 Presses
1 Calender
1 Disinfector.

241. Some of the equipment has proved unsatisfactory and some is badly sited or of the wrong size. This latter point was noticeable in relation to the folding table for linen from the calender. There is no central linen service at any of the hospitals from which laundry is accepted and each ward or department has marked linen which has to be sorted in the laundry before despatch. Linen is transported to and from the department in baskets. These baskets are too small for the loads and are used for the transportation of both clean and dirty linen.

Photograph 17

Photograph 18

242. In general there is a considerable amount of unnecessary handling of both clean and dirty linen.

Sewing room

243. This is a room of 220 sq. ft. close to the laundry and the central supply area of the hospital. There is a staff of three sewing maids and the equipment consists of three electric sewing machines and one electric iron. The staff appears to be adequate for the load of work which is from the Vale of Leven Hospital only. Linen repairs, replacement and marking is done in this room as well as the making of all staff uniforms.

244. Linen for repair or replacement is delivered to the sewing room by ward staff, is examined by the Assistant Matron before repair and returned by one of the sewing maids to the ward or department concerned.

245. The sewing room is too small for three people to work in comfortably and the effective space is reduced by its being used as a bulk linen store. The distribution of light is poor and ventilation is defective.

Points relevant to future planning

246. The advances in laundry equipment since the unit at Vale of Leven Hospital was designed make it difficult to draw any useful conclusions except on points of a general kind, e.g.,

(1) The delivery and collection services to wards and departments must be carefully planned.

(2) The proposed work flow in the laundry must be studied in detail at the planning stage.

(3) The handling and sorting of items should be reduced to a minimum.

(4) Laundry containers (or trolleys) should be of suitable size.

(5) Suitable facilities for the storage and repair of linen should be provided.

XV - DISPOSAL OF REFUSE

Description

247. Refuse for disposal from wards and departments is placed in galvanised iron bins and collected daily by porters. Mention has already been made of the incorrect use of the domestic service room in the wards for the collection of refuse. The bins are taken to the basement by lift, the contents being tipped out near the incinerator to form a pile which may be several feet high. Articles such as bottles and tins are picked out by hand. The pile of loose refuse awaiting incineration contains items which are heavily contaminated.

248. Service hoists connecting the ward kitchens with the basement were intended for the removal of kitchen refuse but have never been used because of the difficulty in arranging for their unloading at the basement.

249. The incinerator is located below the boilerhouse in a poorly-lit, ill-ventilated alcove of 220 sq. ft. at the end of the basement corridor. The unit appears to be of insufficient burning capacity to deal with the load as the process takes several hours to complete. A blow-back of smoke and fumes occurs frequently when the incinerator has been freshly charged.

250. The bins are rinsed in the incinerator area and returned to the wards. Non-combustible items and ash are taken by barrow and deposited behind the boilerhouse. This heap may smoulder for a considerable period of time and dust from it was observed blowing back towards the hospital.

251. The system of disposal described above is agreed to be unsatisfactory and it may be noted that the use of disposable bags which will be burned with their contents is contemplated.

Points relevant to future planning

252. Disposal arrangements are of the greatest importance and an efficient system should be ensured. This requires:-

(1) a suitable area for the temporary storage of refuse prior to collection;

(2) the use of easily identifiable containers for the various types of refuse i.e., items for incineration or for collection by the Local Authority;

(3) a satisfactory collection routine; the use of numerous service lifts in low buildings requires a well organised system of clearance;

(4) incinerators of adequate capacity to dispose of refuse rapidly and without nuisance;

(5) satisfactory disposal of ash from the incinerators.

XVI - ADMINISTRATIVE AND RECORDS OFFICES

The administrative unit

253. The area of a standard building unit, 100' x 40' was originally intended to accommodate the administrative offices, a board-room and an entrance hall. This area has proved to be too small for these functions and the board-room of some 310 sq. ft. has been converted into two offices for clerical staff.

254. There is an entrance hall of 460 sq. ft. which is light and spacious. The Medical Superintendent, Group Secretary and Matron have individual rooms which are of adequate size but those for secretaries, typists, and accounting staff are too small. The meetings of the Board of Management for Dunbartonshire Hospitals are held at Dumbarton, but the absence of a committee room at the Vale of Leven Hospital is found to be inconvenient. There is no hall at the hospital in which large meetings can be held and the central supply arena has been found to be an unsatisfactory alternative for large meetings or assembly purposes.

255. The transmission of sound from the overhead dining room and adjacent rooms, and the lack of privacy due to the use of semi-opaque glass panelling in the corridor walls of the offices are unsatisfactory features of this unit.

Records

256. The records office, the reception area and the records store each of 200 sq. ft. are situated in the out-patient area of the hospital. The staff consists of a records officer and four assistants. The accommodation is well placed in relation to the main entrance for patients, but the records office has no outside lighting or ventilation. A separate office has not been provided for the records officer and the records store is in part of the area originally planned as the admission unit.

257. The unit system of records is used and the normal range of medical statistics is compiled. The records office deals with the registration of out-patients and casualties and with arrangements for the admission of patients from waiting lists.

Points relevant to future planning

258. Estimates of the number of people using the various rooms in the administrative area are necessary.

259. The space required for the storage of records should be calculated.

260. Particular attention should be paid to the lighting and ventilation of internal rooms.

261. The need for committee rooms and halls should be examined at the stage of functional planning.

262. Consideration should be given to auditory and visual privacy in offices.

XVII - STORES

Central stores

263. The general stores are conveniently sited for the receipt of goods. A receipt hall of 655 sq. ft. and the main storage accommodation of 1330 sq. ft. are at ground floor level. A small office of 70 sq. ft. is adjacent to the goods receipt hall. A food store is situated on the first floor near the main kitchen. The staff consists of one storekeeper and an assistant storekeeper.

264. Vans delivering goods at the receipt hall can back into an area 10' x 18' which is sheltered by the first floor structure. The fact that neither the unloading platform nor the trolleys that are used are level with the floor of the van, causes double handling of the goods which are unpacked and sorted in the hall. From the hall, food supplies are taken by lift to the first

floor where they may be weighed before delivery to the kitchen store. General stores are wheeled through a short 6' wide corridor past the storekeeper's office into the central store which is at the same level.

265. In spite of the loss of some 270 sq. ft. to form a supplementary pharmacy store, the floor area of the main store appears to be adequate even when allowance is made for the fact that the volume of material to be stored varies from time to time.

266. The assistant storekeeper delivers supplies to the various units in the hospital by a daily trolley service. Outside units are supplied by van.

General storage

267. There is no centralised store where items of furniture and equipment in current use can be held, serviced, and made available on request. There are several "stores" in the basement and as the need for the storage of records, laboratory materials, etc., has increased, rooms not designed as stores and part of the basement corridor are being used for this purpose. It is estimated by the staff that an area of some 2,000 sq. ft., half the size of a standard building unit would be necessary to provide for the increasing demands, in a less scattered and more easily supervised manner.

268. Certain duct spaces used for storage in the basement are damp and exceedingly unsuitable for this purpose.

269. The main store in which beds, mattresses and general equipment are kept is congested and inconvenient.

270. At the time of the survey one "store" was being used by a joinery contractor for timber and tools and a painting firm was using part of the engineer's store for their materials.

271. The following is a list of rooms in the basement area being used for storage purposes:-

	Area	Square feet (approx.)	Function	Remarks
(1)	Incinerator alcove	220	Tipping and burning of rubbish	Patients' empty soft drink bottles are temporarily stored here and may occupy an area of 20 sq. ft.
(2)	Engineers workshop	225	Workshop and cupboard storage	Originally dirty linen room.
(3)	W.V.S. Library	310	Office and store for library books	Originally clean linen room.
(4)	Engineer's office	90	Office and electrician's store	Originally clean linen despatch room.
(5)	Pharmacy store (under staircase). Also sink and table in duct used in conjunction with this room	50	Store and preparation of disinfectants	Disinfectant cans and drums are carried up and down staircase.
(6)	Switch room	225	Store for laundry and electrical spares	
(7)	Joiner's store	90	Storage of timber and tools	

	Area	Square feet (approx.)	Function	Remarks
(8)	Duct space	670	Storage of sanitary fittings, radiators and beds	Storage area could be doubled if a waterproof concrete floor were constructed.
(9)	Master clock room	180	Storage of X-ray films	Originally medical equipment store. Clock originally in records office but had to be moved because of the noise it made.
(10)	Records store (Under stair-case)	50	Storage of office files	
(11)	Medical equip-ment store	175	Storage of crutches, bed tables, beds and mattresses	Congested.
(12)	Physiotherapy store	40	Storage for deck chairs and couches	
(13)	Switch room	100	Storage of pathological specimens	About half this room now used for storage.
(14)	Equipment store	100	Storage of crutches and splints	Mainly used for out-patient and fracture clinics.
(15)	Accountant's store		Storage of old files	

272. The following articles were being stored in the basement corridor at the time of the study:-

Laundry hydro extractor	1	Redundant machinery or scrap awaiting removal.
Soap tanks	3	do.
Laundry collar machine	1	do.
Gas fired steriliser	1	do.
Vertical sterilisers	1	do.
Pedal bins	1	do.
Bowl steriliser	1	do.
Ironing board	2	do.
Old hoist cable		do.
Pipes and fittings from laundry conversion		do.
Trestle) Lifting gear)		Too large to store in engineer's store.

Empty disinfectant cans mainly 2 gallon capacity	30	Awaiting removal.
Two bins at pharmacy disinfectant store		Used by laboratories.
One large metal drum		Used by pharmacy.
Bins	7	The articles listed opposite were distributed in the duct under the north wards.
Beds	5	
Mattresses	3	
Pillows	3	
Bed screen	1	
Stretcher poles	4	
Special chair	1	
Frames	1	
Small movable timber staircase	1	
Small trolley	1	
Small wire baskets	4	
Bins	8	The articles listed opposite were distributed in the duct under the south group of wards.
Beds	6	
Mattresses	3	
Iron side frame of bed	1	
Bed leg cage	1	
Overbed tables	3	
Semi-circular treatment lamp	1	
Timber slatted racks	2	
Miscellaneous pieces of timber		

Points relevant to future planning

273. Assessment of the various types of storage space is important. The need for storage space for records of all kinds will increase for some years after a hospital is opened and this should be taken into account at the planning stage.

274. Widely scattered or improvised areas for storage make stock control and supervision difficult.

275. The association of facilities for maintenance and repair with a centralised storage area would ensure that items of furniture and equipment are in good order when issued for use.

276. An area should be provided for the temporary storage of materials used by carpenters and painters working under contract.

277. Ducts and switch rooms should not require to be used for storage purposes.

XVIII - TEACHING DEPARTMENT

General description

278. The department consists of two lecture rooms, one for 16 and the other for 8 students, a demonstration room, a study/library, two tutor's offices and one cloakroom.

279. At the time of the study the student complement of the hospital was 50 with a total of 10 or 12 students in the department at one time. The teaching day is from 9 a.m. to 4.30 p.m. There are two Sister Tutors.

280. The department is poorly sited with the main corridor from the hospital to the nurses' home passing through the centre of it. The corridor wall of all the rooms is of semi-opaque glass which affords little auditory or visual privacy. There is a regular stream of traffic between the hospital and the nurses' home which is distracting to students and creates a difficult atmosphere for teaching. The windows throughout the department are difficult to control and the ventilation is poor.

Detailed description

281. *Lecture room.* These rooms of 560 and 205 sq. ft. are adequate in size for the present number of students but could not accommodate more. They are too small to allow the full use of visual aids in teaching and the desks are too close together for examination purposes.

282. *Demonstration Room.* This room of 530 sq. ft. is adequate in size for present use but is somewhat limited in use by the presence of a central pillar. There is sufficient cupboard space, although some cupboards are too high to permit easy access and the sliding doors are of an unsatisfactory type. The sinks in this room are too shallow and have the wrong type of tap in relation to nursing equipment. The radiators are situated under the window ledge and this tends to make them inefficient.

283. *Study/Library.* This room of 110 sq. ft. which can only accommodate three students at one time is too small and it is difficult to ventilate.

284. *Cloakroom.* This is adequate for the small number of students at present in the department at any one time.

285. *Offices.* One office of 120 sq. ft. is of a satisfactory shape but the other one while of similar floor area is a long narrow room (7' wide) in which it is difficult to place a desk. Both offices have semi-opaque glass walls on the corridor side which is a disadvantage particularly when meetings or interviews are being held.

Points relevant to future planning

286. In planning a teaching department it is essential that the size of class rooms and studies should be related to the number of students to be accommodated and to the use of visual aids.

287. A teaching department should not be planned on either side of a main corridor between two other units.

288. Long narrow offices should be avoided.

289. Semi-opaque glass walls for offices and teaching areas are unsatisfactory

XIX - NURSES' HOME

General description

290. The nurses' home is linked to the main building by a connecting corridor on the top floor and access to it from the hospital is through the teaching department. The nurses' home itself is a two-storey building with accommodation for a total resident staff of 72. For each group of eighteen bedrooms there is a sitting room and a utility room.

291. As at present equipped with some free standing furniture and wash basin, the nurses' bedrooms which vary in floor area from 100 to 120 sq. ft. appear to be too small, and the degree of structure-borne sound is excessive.

Photograph 19

Detailed description

292. Heating is inadequate in certain areas of the home. This is particularly marked in the sitting rooms and end bedrooms.

293. The windows are difficult to operate. The catches are poor and the windows may blow out if the wind is strong.

294. There is a lack of drawer accommodation in the bedrooms and some of the beds are only 2'6" wide.

295. Table surfaces which are not sealed are badly stained.

296. Only one small room is provided for visitors. This room is badly sited behind the home sister's office and is inadequate for its purpose.

297. A room of 460 sq. ft. is the only accommodation provided for recreational purposes and is used mainly as a T.V. room.

298. In the utility rooms, which are 170 sq. ft., there is no work table, the irons are of an unsatisfactory type, and the drying cupboards are inadequate.

299. The front entrance to the home is concealed and is often unattended.

Points relevant to future planning

300. When the size of a proposed nurses' home has been decided, it is important that a reasonable and efficient range of fitments and facilities should be provided for each group of rooms. A nurse should have a room large enough to allow her to use it for sleeping, studying and storing her personal belongings. The use of recessed furniture and wash basin would provide more effective floor space. The heating, ventilating and sound proofing of the accommodation requires careful attention. Provision for visitors and recreational space need not be elaborate but should be carefully planned.

XX - TOILET AND CLOAKROOM ACCOMMODATION

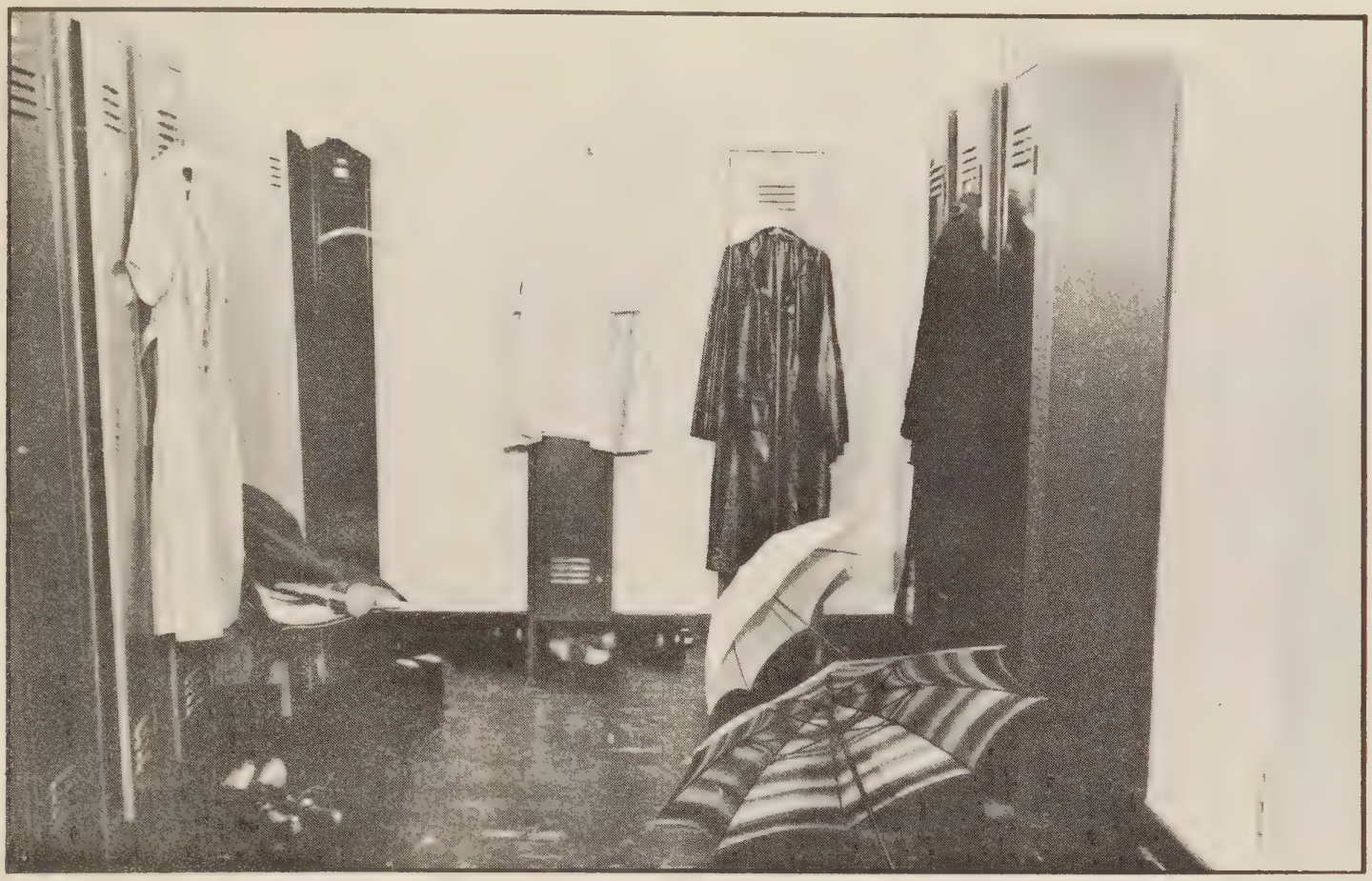
Description

301. The following schedule (para. 305) shows the sanitary and locker fittings for non-resident staff. The facilities provided are inadequate e.g., the 61 domestic workers share four w.cs., four hand basins and 61 lockers which are located in one room 300 sq. ft. in area.

Photograph 20

302. The 59 non-resident nurses have only 40 lockers contained in four rooms designed as box-rooms which are poorly lit and ventilated. The total locker room area amounts to approximately 400 sq. ft. They have to share

resident nursing staff toilet facilities which are adjacent to their changing rooms. The standard lockers provided are not deep enough to take a coat-hanger and it was noted that wet coats and clean uniforms were hanging on the outside of some of the lockers. There is no provision for dirty uniforms.



Photograph 21

303. Male physiotherapists, cooks and kitchen maids require to walk considerable distances to toilet facilities as they have none in their departments. The porters' toilet accommodation is remote from their station.

304. Female physiotherapists and radiographers both use w.cs. originally intended for patients, while the three male telephonists share a patients' toilet in the out-patient department.

305. Schedule of sanitary and locker fittings for non-resident staff

Staff	M or F	No. of Staff	Lockers No.	Lockers Remarks	Number of W.Cs.	Number of Urinals	Number of Basins	Number of Showers	Remarks
Board of Management	F	16	16	Locker space very confined area approx. 42 sq. ft.	2	-	2	-	
Administrative and Clerical Staff	M	8	None	Six coat pegs in toilet. Senior staff keep outdoor clothes in their rooms.	1	1	2	-	Clerk of Works has a W.C. adjacent to his office.
Nurses Part-time	F	43	40	A number of lockers are shared.	-	-	-	-	Share resident nurses' toilet facilities.
Nurses Full-time	F	16							
Physiotherapist	M	2	2	Eight of the lockers are in switch room, two in wax room and one in toilet.	-	-	-	-	Use toilet facilities in Administration Block.
	F	5	5		1	-	1	-	The W.C. originally intended for patients.
Radiographer	F	4	4		2	-	2	-	One of the W.Cs. originally intended for patients.
Pharmacist	F	3	3	Locker in toilet.					
Laboratory Clerical	F	2	2	Lockers in toilet.	1	-	1?	-	Unnecessarily large accommodation 180 sq. ft.
Laboratory Technicians	M	10	2	Lockers in toilet.	1	-	2	-	

Staff		M or F	No. of Staff	Lockers No.	Lockers Remarks	Number of W.Cs.	Number of Urinals	Number of Basins	Number of Showers	Remarks
Van driver		M	1	None						Uses porters' toilets adjacent to central store.
Laundry		F	14	14		2	-	2	-	Toilets adjacent to laundry.
Tradesmen	Stokers	M	4	4	Lockers in boiler house.	1	-	1	1	
	Semi-skilled Engineer	M	1	1	Locker in workshop.					Uses stokers' toilet facilities.
	Electrician	M	1	None	Keeps clothes in workshop.					Uses porters' or stokers' toilet facilities.
	Sewing maids	F	3	None	Clothes kept in sewing room.					Use maids' toilets opposite central store.
	Store keepers	M	2	1	Locker in store keepers' office.					Use porters' toilet facilities.
	Telephonists	M	3	None	Clothes kept in telephone room.					Use patients' toilets in out-patients department.
Domestic	Cooks and Kitchen maids	F	15	15	Lockers in maids' toilet accommodation opposite central store. (See photograph No. 32).					Use maids' toilet facilities opposite central store.
	Maids	F	41	41	Lockers in central changing accommodation in basement.	4	-	4	-	A total of 61 women use these toilet facilities. The accommodation at certain times of the day is overcrowded.
	Porters	M	13	4	Lockers in toilet.	1	1	1	-	

Points relevant to future planning

306. A careful assessment of the number of non-resident staff using each department should be made before schedules of accommodation are drawn up.

307. Properly supervised changing and cloakroom facilities, including showers, should be provided for non-resident staff near the main entrance to the hospital. Staff toilet facilities should be available in each department.

308. Lockers should be capable of holding a coat-hanger and built-in fittings economically arranged. Cloakrooms should have chairs, wall mirrors, ash trays and a clock.

309. All toilet facilities and cloakrooms should be well ventilated and lit. Facilities for drying wet coats should be provided.

XXI - FABRIC

General description

310. The ward units and other departments except the kitchen, stores and boiler house and mortuary are contained in standard rectangular buildings. These are two storey structures each 100 ft. x 40 ft. with stanchions at 20 ft. centres. Steel perimeter beams surrounded with concrete, are positioned at first floor and roof level and are checked to support 9" pre-cast hollow beams with a 3" screed. The roof is finished with 3 ply felt and the floors with various materials, mainly thermoplastic and cork tiles.

311. The kitchen, stores and boiler house are steel-framed structures with non-load-bearing cavity walls. The main service spine corridor and ward link units which are not likely to be subject to alterations, have load bearing cavity walls. The brickwork generally has a rough-cast finish. The lift and water tower are built with facing bricks with fluted asbestos sheet cladding. The structure of the standard units is designed to take a third floor. It is, however, unlikely that any future development will make use of this provision. The planning of the various departments within these buildings has been limited by the fixed dimensions of the standard units.

Detailed description

312. *Cladding.* Pre-cast concrete mullions have been inserted between the *in situ* perimeter beams at 3'4" centres and are rebated to receive the prefabricated wall panels. The panels are faced with either diagonal or vertical cedar boarding. One type of panel provides the solid walls and five types are used for service types of single glazed windows.

313. The use of standard mullions at 3'4" centres would in the event of alterations allow greater latitude in the placing of partitions than is permitted by traditional construction. No alterations of this kind have yet been carried out but may be undertaken in the future.

314. The cedar panels have weathered very unevenly (see photograph No. 22) and are also badly stained.

Photograph 22

315. The use of a number of cross sawn timber boards and the ineffective initial treatment account for the uneven weathering. The staining is due to poor detailing. There is only $\frac{1}{8}$" between the bottom edge of the boarding and the sill. When it rains water splashes on to the edge grain and is drawn up by capillary attraction.

316. *Windows*. The largest standard window used is 4'5" high x 2'8" wide. These windows have twisted because the soft wood sections of timber are too small ($2\frac{3}{16}$" high x $1\frac{5}{8}$" wide).

317. The windows are fitted with friction hinges which quickly work loose and are a constant irritation to the users. Even in a light breeze they move to and fro and a number have been blown from their frames.

318. *Floors*. The 9" pre-cast hollow beams covered with $1\frac{1}{2}$" screed do not provide sufficient sound insulation between floors and the construction is not strong enough to prevent cracks in the floors and ceilings.

319. *Partitions*. In the administration unit plastered light-weight blocks have been used between rooms but do not provide an adequate barrier against sound.

320. Certain of the offices and rooms in the nurse training school have semi-opaque glass partitions on the corridor side. These glazed screen walls are not an effective barrier against sound and it is distracting to the occupants to be able to see people moving along the corridor.

321. *Protection of Corners*. Corners of corridor walls have patent metal protection strips but these have not provided sufficient protection against impact from trolleys and the plaster on each side of the metal strip has been damaged in many areas.

322. *Maintenance*. Apart from the cedar boarding which was treated, the whole of the exterior of the building has been painted after construction. To maintain the appearance of the building and keep the exposed structural elements in good condition it should be painted every 3 or 4 years.

Points relevant to future planning

323. There is no doubt that the use of comparatively small standard units of fixed dimensions to house various departments is economical and speeds up building. The fixed dimensions, however, provide a severe limitation to the functional planning of the departments. A mass produced prefabricated structural system which could be put together in various ways to give flexibility in planning might be worth developing.

324. The use of mass produced prefabricated cladding panels and mullions which were quickly erected proved to be a comparatively cheap and satisfactory form of cladding.

325. Only if plans of proposed hospitals are made up of components large enough to allow freedom of planning for future vertical extension would it be justifiable to provide initially a structure to take extra floors. The Vale of Leven hospital units which are 100' x 40' are too small to make it worth while extending upwards.

326. Corners and surfaces of corridors liable to be subjected to heavy traffic should be protected by rails set proud of the wall so that they can be easily cleaned.

327. On exposed sites where it is proposed to use natural cross ventilation great care should be given to the design of the windows. Adjustable louvres should be incorporated so that the air flow can be controlled in windy periods without opening the windows.

328. Hospital buildings should be constructed of materials that require the minimum of maintenance.

	Area	Material	Treatment	Condition	Cleaning	Remarks
329.	Wards (1) Bed and circulation area and Sister's room	Cork tiles	Sealed six years ago.	Slightly pitted, stained and scratched. More marked in places where it is subjected to heavy traffic near ward and utility room entrances and under Sister's desk.	Circulation space polished daily, day space and Sister's room weekly with traffic wax. Damp mop used to remove stains before waxing.	Quiet, resilient and of pleasant appearance. A suitable floor for portions of a ward not subjected to fairly heavy traffic.
	(2) Ancillary rooms	Thermoplastic tiles	-	Badly pitted scratched and stained in Kitchen, Utility room and H.M.C.	Washed daily.	Noisy and difficult to keep clean.
330.	Dining rooms	Thermoplastic tiles	-	Badly pitted, scratched and stained.	do.	do.
331.	Laboratories	Thermoplastic tiles	-	Slightly pitted and scratched. Badly stained in places where chemicals are used.	do.	Noisy and difficult to keep clean. Static electricity tends to accumulate in the tiles. This has caused mild electric shocks and has affected meter readings. Some tiles are lifting due to spilled chemicals.
332.	Pharmacy (1) Dispensary	Cork tiles	Sealed six years ago.	Good	Polished once per week with traffic wax or when necessary.	Suitable floor for this room.
	(2) Sterile products room	Terrazzo	-	Fairly Good	Washed daily or when necessary.	The junction of walls and floor are difficult to clean as there are no coved skirtings.
333.	Kitchen	Quarry tiles	-	Good	Washed daily.	Noisy, tiring to walk on for long periods. Joints between tiles are difficult to clean.
334.	Laundry (1) Despatch area	Greenwood blocks	-	Fairly Good	Washed daily.	Appears to be a reasonable floor for this area.

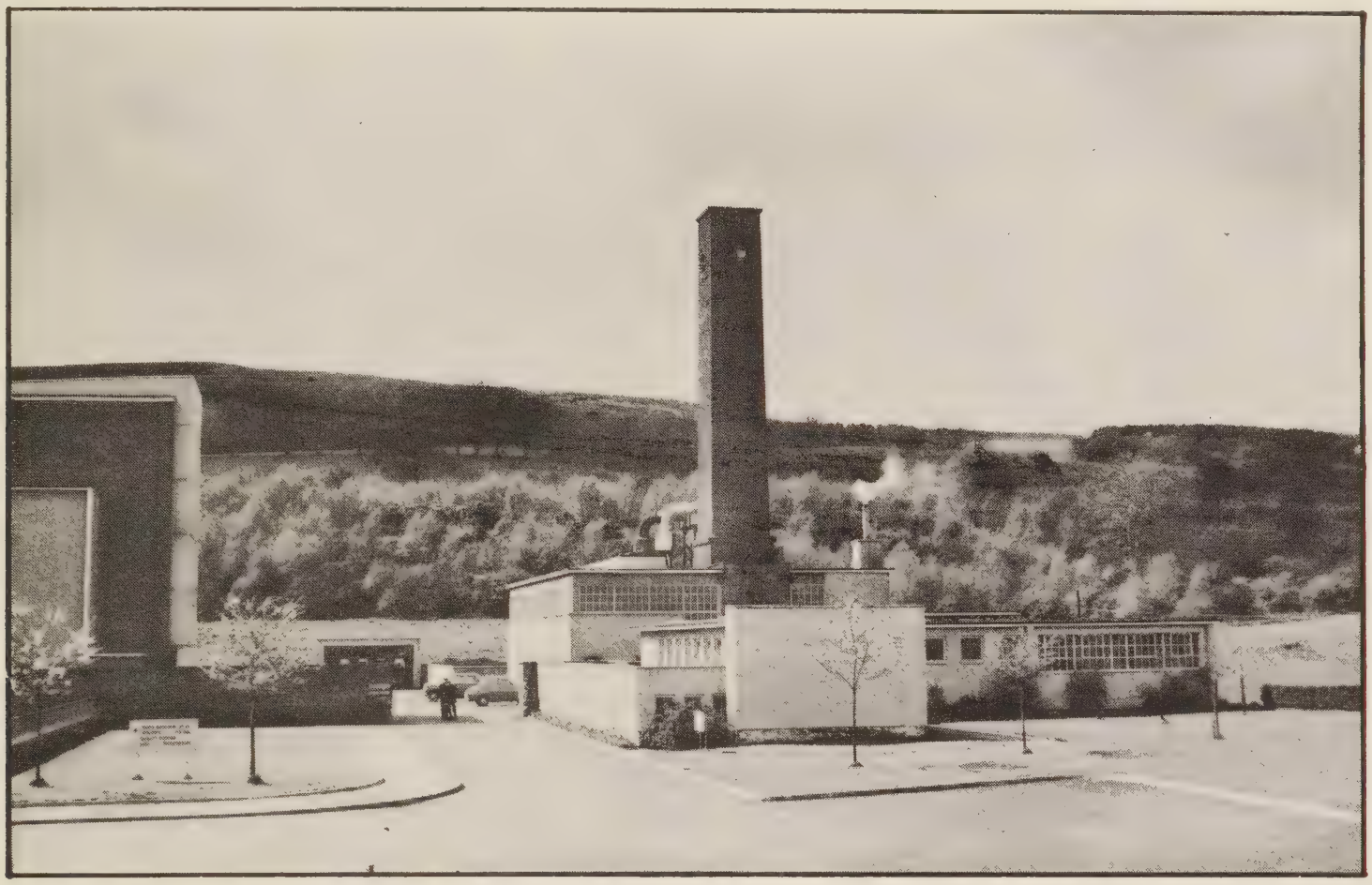
	Area	Material	Treatment	Condition	Cleaning	Remarks
	(2) Washing area	Granolithic	-	Badly cracked, pitted and stained.	Floor swept and hosed down every day and washed every other day.	Floor is not laid to correct falls. This results in pools of water forming in certain places. The granolithic finish is badly stained where oil has dripped from the machines. The floor is difficult to clean.
335.	Ground and first floor corridors, supply hall and stairs	Thermoplastic tiles	-	Slightly pitted, scratched and stained.	Washed daily.	Noisy and difficult to keep clean. Staircase nosings slippy where polished.
336.	Out-patients department	do.	-	do.	do.	do.
337.	Operating Theatre Suite	Terrazzo	-	Cracked and stained in places.	Washed daily and when necessary.	Noisy, tiring to walk or stand on for long periods. Moderately easy to clean.
338.	Animal House					
339.	Post Mortem room					
340.	Administration Entrance Hall	Semi-glazed tiles	-	Fairly good, but a number have worked loose probably due to faulty workmanship.	Washed daily.	Suitable floor.
341.	Boiler House	Granolithic		Fairly good.	-	Suitable floor.
342.	Nurses' Home (1) Corridors and Sitting room	Cork tiles	Sealed six years ago.	Very slightly scratched, pitted and stained.	Polished once weekly with traffic wax or when necessary.	Excellent floor for these areas but slippery areas noted.
	(2) Bedrooms, Kitchen and Entrance Hall.	Thermoplastic tiles	-	Slightly scratched and stained.	Washed daily.	Noisy and difficult to keep clean.
343.	Nurses' Teaching Accommodation	do.	-	do.	do.	do.

Thermoplastic tiles not sealed but treated with wax polish after laying. This was discontinued after a short time as it made the floors slippery.

XXIII - BOILERHOUSE AND MECHANICAL SERVICES

General description and staffing

344. The boilerhouse with its ancillary rooms and the mortuary block are positioned in a separate building at the north end of the site. It is the first part of the hospital to be seen from the approach road.



Photograph 23

345. A basement corridor 7'10" high by 8'8" wide connects the boilerhouse to the main buildings. The flow and return pipes are secured to the ceiling of the corridor. The horizontal development of the hospital results in long runs of services. The boilerhouse is well sited with regard to the prevailing wind and is near the laundry and kitchen which are the main steam users. Fuel bunkers, external fuel and ash stores are positioned to the west of the boilerhouse, and on the east side there is a plant room, the standby diesel, the hospital switch room, a transformer house, and a workshop.

346. The Chief Engineer is responsible for the services of all hospitals in the group and he has the following staff:-

1 Assistant Engineer
1 Electrician
1 Skilled Tradesman

There are also four stokers who work eight hour shifts with one man spare.

Detailed description

347. *Boilerhouse.* The boilerhouse of 2,560 sq. ft. is spacious and contains two horizontal cylindrical multitubular steam boilers, only one of which is in constant use. The boilerhouse has space for an additional boiler to cater for the proposed extensions to the hospital. The room is adequately lit and ventilated by high level windows.

348. Trucks bringing coal to the boilerhouse tip the loads directly over a grill under which there is a sunk fuel hopper which holds approximately

13 tons. An automatic mechanical conveyor carries the fuel to the boiler hoppers. This was not working during the review as one of the links was broken and fuel required to be manhandled. Roughly 40 tons of coal are used per week in winter and 25 in summer. If in winter the trucks do not deliver three times a week, or in summer twice a week, coal has to be removed from the external emergency store.

349. *Boilerhouse and incinerator chimney.* The boilerhouse chimney is constructed of brick and is about 60 ft. high. The top of the incinerator chimney pot is roughly 25 ft. above the ground, and is close to the main chimney (see photograph 23). The chimneys are not high enough to prevent smoke blowing into the hospital when the wind is from the north. The shape and size of the coping are inadequate to prevent eddies carrying the smoke down. Due to this and the amount of smoke from the incinerator the main chimney is very black and unsightly.

350. *Calorifier room.* This room of 1,535 sq. ft. is in the basement of the hospital, adjacent to the main spine corridor. It contains five vertical calorifiers for central heating and five horizontal calorifiers for domestic hot water. Twice as many calorifiers for heating and domestic hot water have been installed as are actually required for present needs. Insufficient height is allowed above the vertical calorifiers for withdrawing the elements for inspection.

351. *Heating.* The hospital is heated mainly by free-standing hot-water radiators. The laboratories have ceiling panels to allow wall space to be used for permanent laboratory fittings.

352. Branches from the main pipes in the ceiling of the basement corridor run in a 2'9" high crawl space at right angles under the standard building units. Access to the pipes is difficult as in many cases they have been placed one above the other near the entrance to the crawl spaces. Vertical access to ducts in the hospital is quite good as they are spacious and have removable panels.

353. The control panel for the heating for the whole hospital except the operating theatres is located in the calorifier room. Apart from regulating the radiators, the only control over the temperature which can be exercised in the departments or rooms is by opening windows. This is not satisfactory and, in some areas - e.g. laboratories - impractical as specimens and papers may be disturbed by the wind.

354. The 4" pipe supplying the nurses' home does not have a circulating pump, consequently the flow is governed by the pressure in the 6" hospital main. The result of this is that the home is often underheated, but if the temperature was raised to 65°F in the home, other parts of the hospital would be overheated.

355. The experience of the laboratory staff is that the ceiling heating tends to make them feel uncomfortable.

356. *Electrical power and lighting.* A standby diesel generator in an area of 340 sq. ft. has been provided adjacent to the boilerhouse, and is designed to start up immediately mains supply fails. It provides emergency lighting and keeps the following essential services functioning: boilerhouse, calorifier room, one bed lift, operating theatres, and the blood bank in the laboratory. While conduit is generally easily accessible, the wiring inside the screen framing to the ward bed lights is particularly difficult to replace.

357. It was obvious that electrical switch rooms should only be large enough to contain the electrical gear and permit easy access. If the rooms are larger than necessary they tend to be used as stores with a consequent risk of fire. Throughout the hospital tungsten light fittings have been installed.

358. *Water supply.* The pressure in the public main varies considerably and when either of the emergency external reservoirs is being refilled the water in the 23,000 gallon cold water storage tank falls to a very low level.

This means that in both the mains and tank supply, pressure is unreliable, but, with the possible exception of the laboratory, as far as most departments are concerned this does not appear to cause any inconvenience.

359. Taps supplying drinking water and tank water are not clearly distinguished, and the layout of pipes is such that the cold water main is heated by the steam main.

360. *Drainage.* Drains run from crawl spaces under each building to courtyards between the buildings. The acute bends in the crawl spaces under the wards frequently get blocked and the pipes are difficult to clear.

361. *Lifts.* There are three electrically operated lifts in the hospital - a goods lift and two serving the wards. They are steel lined and measure approximately 6'4" wide, 8' long, 7'3" high.

362. The two ward lifts are not of the self levelling type and when a difference in level between the lift and the corridor floor occurs the manipulation of trolleys is obstructed. This is unsatisfactory for the transportation of patients and the delicate equipment of X-ray units. The three lift doors are manually operated and are noisy. The goods lift has a hardwood strip floor which has stood up well to wear but the walls are badly scratched.

363. The floors of the ward lifts are covered with linoleum. The walls are protected by a 6" steel rail, the centre of which is 2'6" above the floor, but this has not prevented the wall of the car being scratched to a level of 3'6" above the floor.

364. Each ward kitchen has a manually operated rubbish hoist approximately 2' square. These hoists have two shelves which could accommodate only small quantities of rubbish. In view of the difficulty of servicing these lifts at the basement level rubbish is placed in bins. Porters remove these from the kitchen by the lifts twice daily.

365. *Heating and ventilation of operating theatres.* A small room approximately 330 sq. ft. in area, at the south end of the operating theatre block, houses the air conditioning equipment: below it is a basement of similar area containing the theatre calorifiers and pumps.

366. The air to the theatres, anaesthetic, and sink rooms is filtered, heated, and humidified. It enters these rooms at high level and is extracted at low level. It was reported that the installation does not keep the theatres cool in hot weather.

367. The theatres are heated by flush wall heating panels and thermostats are positioned in each theatre.

368. *Telephone switchboard.* The telephone switchboard is situated between the entrances to the out-patient and casualty departments. At the time of the study three full-time operators were employed. All external calls pass through the switchboard: internal calls are on the PABX system, which is found to be satisfactory.

369. *Staff location.* A system using combinations of five coloured lights is used for staff location. It is controlled by the telephone operator and is used for a total of 28 people. This method of staff location has not been found to be satisfactory and a short wave radio system with individual pocket receivers would be preferred.

Points relevant to future planning

370. While the provision of more than the normal amount of reserve capacity in the boiler installation is not likely to be justifiable as a precaution against future expansion, a spare boiler bay should be included in the layout, and the site should not preclude the extension of the boilerhouse.

371. It is desirable to site the boilerhouse with regard to the prevailing wind and remote from the wards, but close to the main users of steam.

372. Chimneys should be of sufficient height to ensure that the fumes and grit will disperse. It may be necessary to undertake wind tunnel tests where there is doubt about the effect of buildings or hills in the vicinity.

373. Emergency fuel dumps and ash stores should be walled and covered to prevent the dispersal of dust. Water spraying equipment should be provided to quench hot ashes.

374. Sufficient space should be provided in the calorifier room to allow elements to be withdrawn for inspection.

375. All service pipes should be positioned in accessible ducts and so placed that maintenance work can be carried out without difficulty.

376. Free-standing steam radiators are unsatisfactory for hospital buildings. They are difficult to keep clean, take up valuable floor space, and the convection currents they cause distribute dust.

377. Laboratory and operating theatre areas require special consideration as regards heating and ventilation. The installations at Vale of Leven Hospital have not been found to be fully satisfactory.

378. If pressure jet vacuum pumps are to be used in the laboratory this entails a constant water pressure of about 30 p.s.i.

379. The lower running cost of fluorescent lighting as against tungsten lighting makes it attractive economically, and the advantage is enhanced by improved quality and ease of maintenance.

380. Lifts should be self-levelling and their doors should operate quietly.

381. While the existing telephone installation functions satisfactorily, the advantages of more fully automatic systems should be examined in relation to the anticipated load in new hospitals.

XXIV - VISITORS AND CAR PARKING

Description

382. Normal visiting hours are from 3 - 4 p.m. on Wednesdays, Saturdays and Sundays, and on other days from 7 - 7.30 p.m.

383. It was stated that the accommodation for visitors at the entrance hall was deficient, particularly at week-ends, and that while two visitors per patient are admitted to wards at one time, more may arrive, and those who have to wait tend to progress from the front door to the main corridors causing a certain degree of congestion and general inconvenience.

384. Excluding service yards of about ¼ acre, four areas for car parking have been provided, i.e.,:-

Administration area	space for	6	cars
Near Nurses' Home	" "	8	"
At patients' entrance	" "	20	"
Approach drive	" "	24	"
		58	

385. The main drive is 22' wide and it is also possible to park cars on one side of it. This is occasionally necessary and while in this way some 40 vehicles can be accommodated, it entails the parking of some cars at a considerable distance from the hospital entrance.

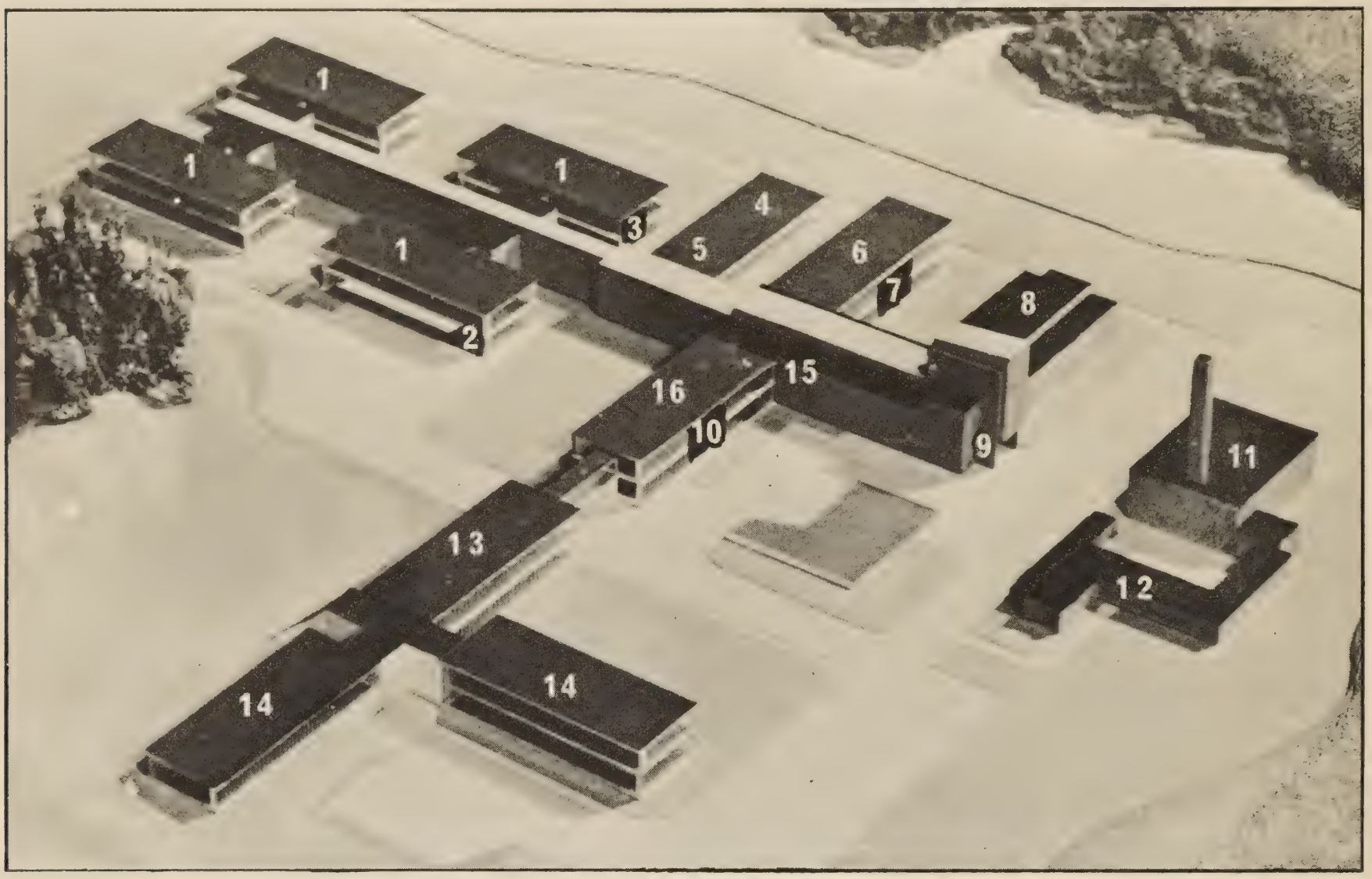
Points relevant to future planning

386. If congestion in waiting areas and lifts is to be avoided the peak number of visitors must be reduced.

387. Suitable waiting and toilet accommodation for visitors near the hospital entrance is important, and its size will depend on the visiting system used.

APPENDIX A

DIAGRAM OF GENERAL LAYOUT OF HOSPITAL



1. Wards
2. O.P.D.
3. Operating Theatres
4. X-ray
5. Physiotherapy
6. Laboratories
7. Pharmacy
8. Laundry
9. Stores
10. Administration
11. Boilerhouse
12. Mortuary and P.M. Room
13. Nurse Training School
14. Residential Accommodation
15. Kitchen
16. Dining Room

Proforma referred to in paragraph 9

REFERENCE: A		DEPARTMENT, ROOM OR SERVICE				DATE .....
No.	Item	Information Required	Information Supplied	Staff Views	Member of Staff	S.H.H.D. Comment
1	Function: intended	Purpose contemplated when designed.				
2	Function: as operated	What is done, dealt with or supplied.				
3	Departments served	List				
4	Accommodation	Accommodation, ancillary rooms, etc.				
5	Capacity	Dimensions, size, number of units of accommodation or potential output.				
6	Load	Average occupancy, output. Periods of maximum and minimum load.				

REFERENCE: B	DEPARTMENT, ROOM OR SERVICE				DATE .....
No.	Item	Information Required	Information Supplied	Staff Views	Member of Staff	S.H.H.D. Comment
7	Equipment/facilities	Range of equipment, facilities, etc., relevant to function.				
8	Staffing	Numbers in all grades, number on duty at one time, hours/sessions worked.				
9	Communications	Links with other departments for control/service purposes.				
10	Sources of control	Who directs operations and regulates load, etc.				
11	Method of control	How is control exercised: what are feed-back arrangements.				
12	Procedure/movement within department: staff patients records other	Method of operation.				

REFERENCE: C	DEPARTMENT, ROOM OR SERVICE				DATE .....
No.	Item	Information Required	Information Supplied	Staff Views	Member of Staff	S.H.H.D. Comment
Service from other Departments, Rooms, etc.						
13	Departments serving	All departments etc., serving department and materially affecting function.				
14	Source of service	Location of immediate supply.				
15	Frequence/regularity	How often; how regularly; how reliable.				
16	Amount/method of ordering	Quantities delivered at a time/method of ordering or varying standard order.				
17	Means of delivery/ service					
18	Usage of service	Comparison with frequency, amount etc., of supply.				

REFERENCE: D	DEPARTMENT, ROOM OR SERVICE			DATE	
No. Item	Information Required	Information Supplied	Staff Views	Member of Staff	S.H.H.D. Comment
Supplementary Points 19					
20					
21					
22					
23					
24					

APPENDIX C

NOISE MEASUREMENTS MADE AT VALE OF LEVEN HOSPITAL ON 24.4.61

(All measurements were made using a Dawe Sound Level Meter, type 1400D. This meter incorporates the three standard weighting networks (A.S.A. Z24.3-1944). Thus when the appropriate weighting network is used the measurement is defined as *sound level in decibels* (db S.L.))

Results

I **In Nurses' Home** (time 10.30 a.m.) see diag. I

in room A with door shut,	background noise	=	30 - 35 db S.L.
	door B being unlocked	=	50 db S.L.
	door B being shut	=	60 db S.L.
in corridor at C,	background noise	=	35 - 40 db S.L.
	mop bucket emptied at E	=	64 - 66 db S.L.
	door banged upstairs	=	60 db S.L.
in entrance hall at D,	background noise	=	40 db S.L.
	mop buckets upstairs	=	55 - 60 db S.L.

II **In teaching corridor** (time 10.15 a.m.) see diag. II

in corridor at B,	kitchen noise i.e. background	=	40 - 45 db S.L.
in Room A with door shut,	background noise	=	40 db S.L.
	footsteps in corridor	=	45 db S.L.
	talking in corridor	=	40 - 45 db S.L.
	clapping in corridor at C	=	48 - 50 db S.L.

III **In administrative corridor** (time approx. 12.30 to 2.00) see diag. **III**

in corridor at D,	background noise	=	45 db S.L.
	doors closing	=	60 db S.L.
	vacuum in use	=	63 db S.L.
(in typists' room B,	one machine in use	=	67 db S.L.
(in accountants' room C,	one machine in use in B	=	40 db S.L.
(	machine not in use in B	=	32 db S.L.
doors shut in all cases (in Mr. Campbell's room A,	no sudden sounds upstairs	=	40 db S.L.
(	doors in admin. corridor	=	50 - 70 db S.L.
(	doors upstairs	=	64 db S.L.
(	chairs moving in dining hall	=	65 - 70 db S.L.

APPENDIX D (Contd.)

IV **In kitchen corridor and adjoining wards** (time 11.30 approx.) see diag. **IV**

in main kitchen, background noise,	at A	=	80 db S.L.
	B	=	78 db S.L.
	C	=	76 db S.L.
outside main kitchen, in corridor,	at D	=	68 db S.L.
in corridor to ward 6,	at E	=	64 db S.L.
in corridor to ward 5,	at F	=	60 - 70 db S.L.
inside ward 5, at nurses' station,	ward quiet	=	45 db S.L.
at ward entrance,	ward quiet	=	50 db S.L.
in top corridor at G, sudden sharp noise viz. clap		=	82 db S.L. *

V **In lower corridor and adjoining wards** (time 12.00 approx.)

in lower corridor, at point corresponding to G in **IV**			
	sudden sharp noise viz. clap	=	78 db S.L. +
in wards 3 and 4, general background, at entrance		=	62 db S.L.
in ward day room + T.V.		=	60 db S.L.
in ward itself		=	54 db S.L.

VI **In biochemistry laboratory**

in lab., background noise, fume cupboard off,			
	centrifuges off	=	54 db S.L.
	fume cupboard off, 2 centrifuges on	=	75 db S.L.
	fume cupboard motor on, centrifuges on	=	69 db S.L.
	fume cupboard motor on, centrifuges on (front panel removed)	=	71 db S.L.

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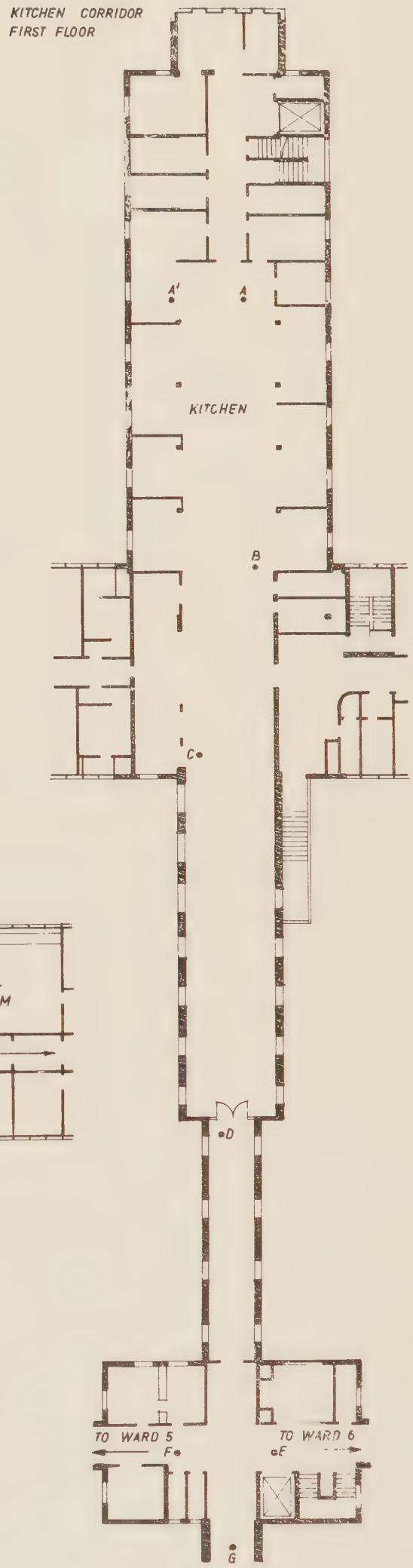
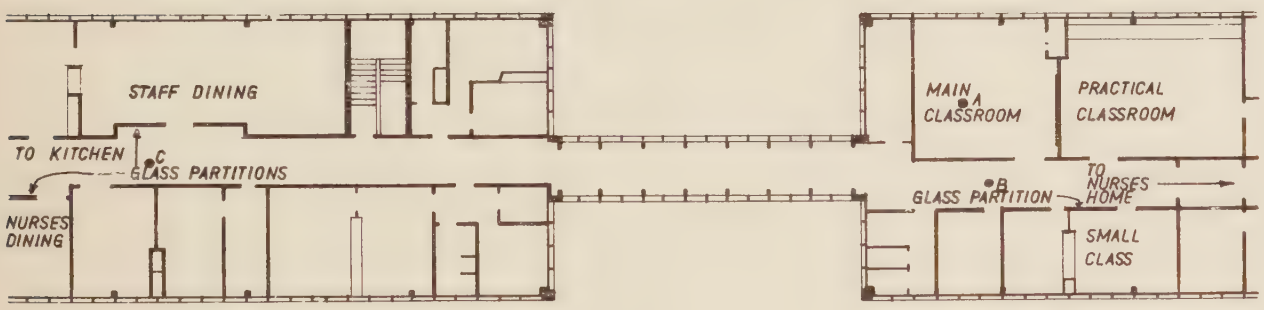
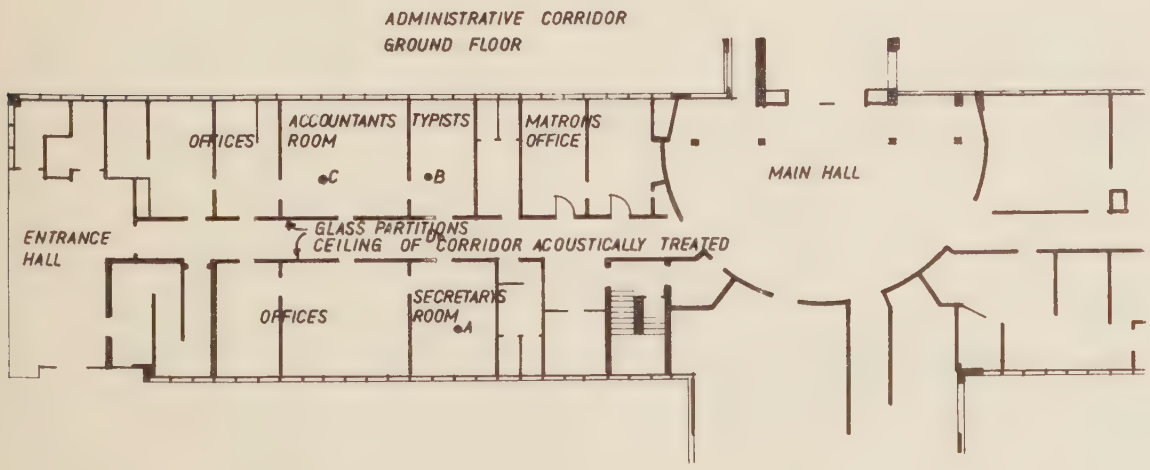
* reverberation time appeared to be longer than normal.

+ reverberation time less than *.

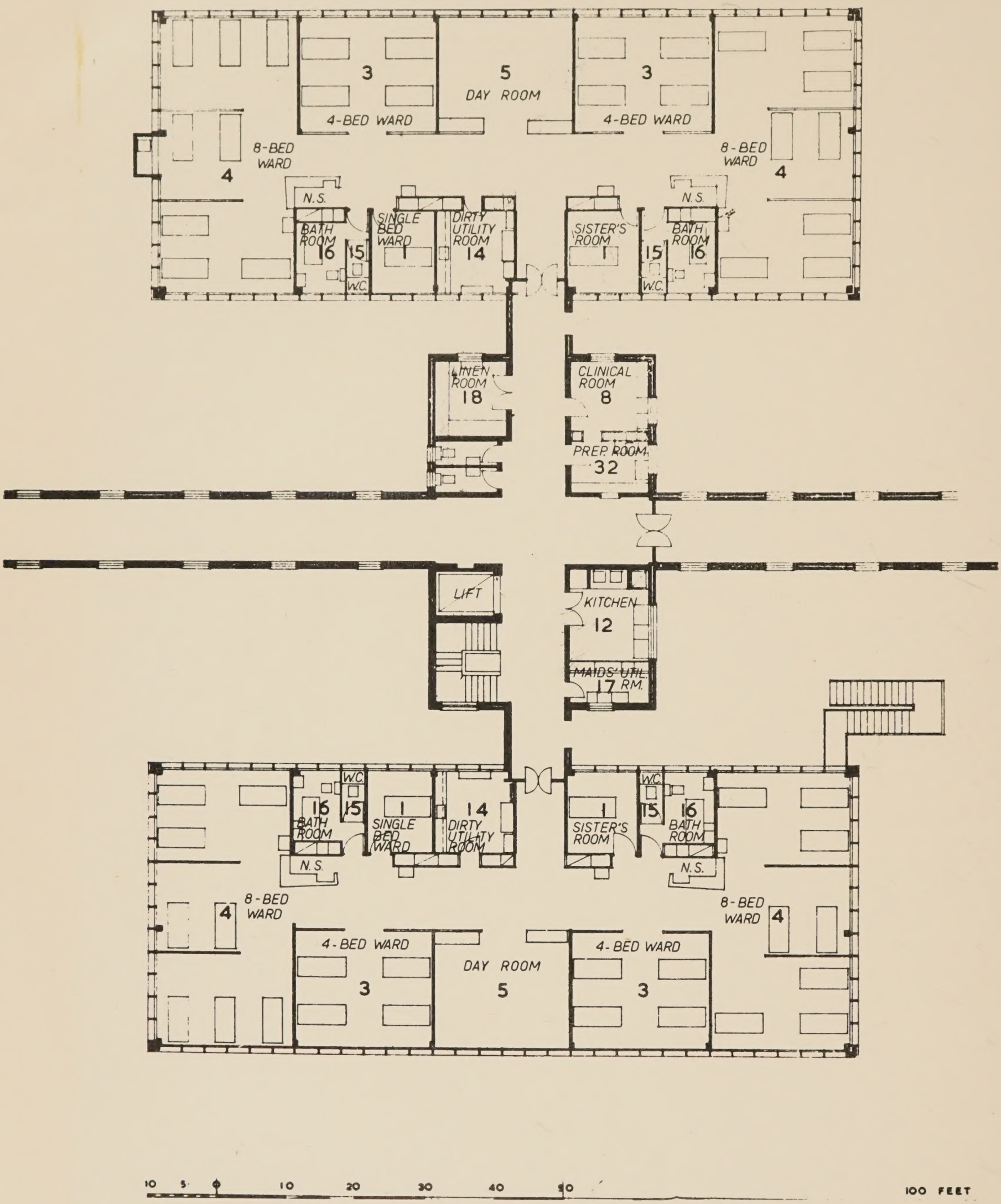
DIAGRAMS SHOWING LOCATION OF POINTS WHERE NOISE MEASUREMENTS WERE MADE







C


3
4-BED WARD
5
DAY ROOM
3
4-BED WARD
8-BED WARD
4
8-BED WARD
4
N.S.
BATH ROOM
16
15
W.C.
SINGLE BED WARD
1
DIRTY UTILITY ROOM
14
SISTER'S ROOM
1
15
W.C.
N.S.
BATH ROOM
16
LINEN ROOM
18
CLINICAL ROOM
8
PREP. ROOM
32
LIFT
KITCHEN
12
MAIDS' UTIL. RM.
17
WC
15
16
BATH ROOM
N.S.
1
SINGLE BED WARD
14
DIRTY UTILITY ROOM
1
SISTER'S ROOM
WC
15
16
BATH ROOM
N.S.
8-BED WARD
4
8-BED WARD
4
4-BED WARD
3
DAY ROOM
5
4-BED WARD
3
10 5 0 10 20 30 40 50
100 FEET

Hospital Planning Notes

The Scottish Home and Health Department's Planning Committee have prepared interim Notes on various aspects of hospital design, to be issued as a series of Hospital Planning Notes. These interim Notes are intended to provide guidance for those concerned with hospital plans pending the issues of comprehensive bulletins based on longer term studies of particular departments and functions of hospitals. Account is taken in the Notes as they are issued of the information available from recent plans; and in view of the volume of planning work now being undertaken with relatively limited resources the Department hope that these Notes will help to avoid unnecessary duplication of work in preparing plans for units containing elements which have already been the subject of detailed study in connection with other schemes.

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